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A McGRAW-HILL PUBLICATION

JULY 1956

35 CENTS

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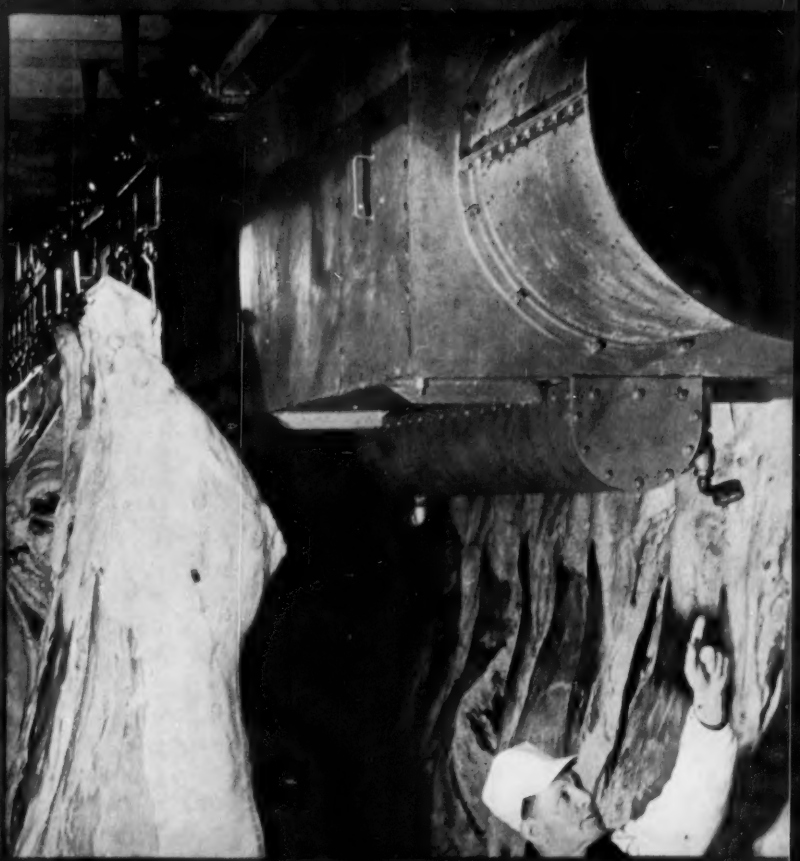

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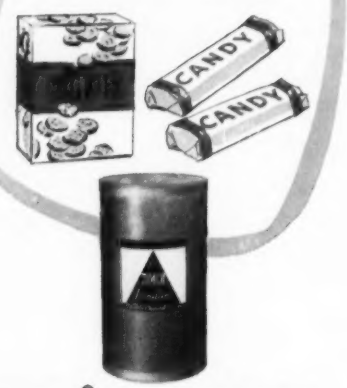

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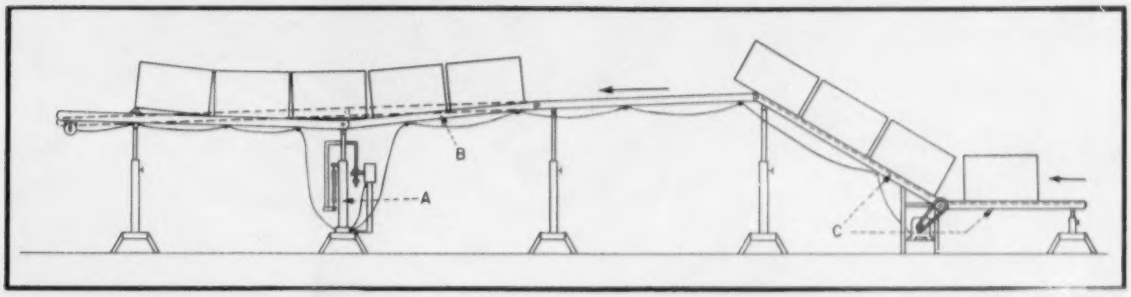


Stop-and-Start Control

In our plant, live conveyors transport and elevate cases to the gravity conveyors that carry them to the unloading zone and also serve as accumulators.

All went well so long as the cases were removed as fast as they arrived in the zone. But if they backed up on the live conveyors, damage to the cases was the usual result.

Here's how we now stop the line before the accumulator is filled:

The gravity conveyor has been hinged at its middle point, where it rests on a stop-and-start overload control. This latter mechanism is of simple fabrication.

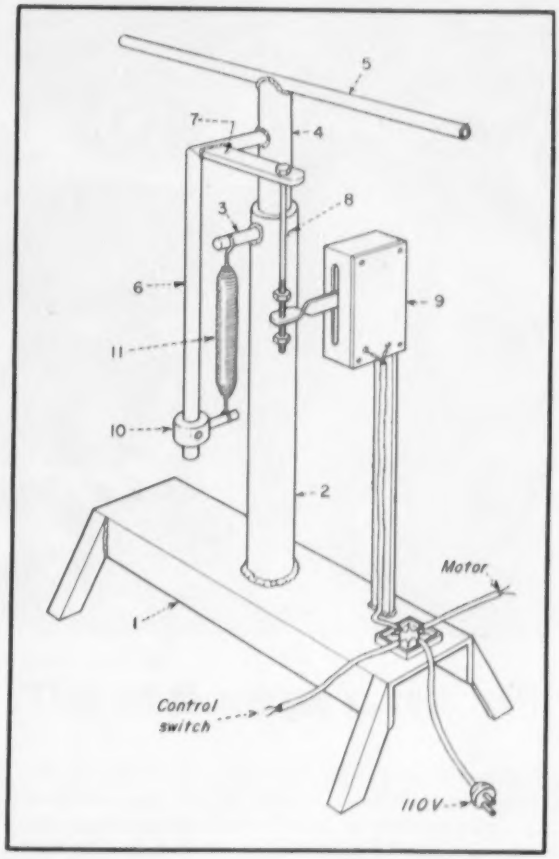
Onto a metal bar—(1) in right sketch—a length of 1¼ in. i.d. pipe (2) was welded in an upright position with a slotted steel strap (3) welded in a horizontal position near its top.

Telescoped into the 1¼-in. pipe, for height control, was another length of pipe (4) of 1 in. i.d. The length of ½-in. pipe (5), welded to the top of this 1-in. length, provides a cross-bar support for the gravity conveyors at the hinged location.

Now, an L-shaped section (6) was fabricated from ½ in. pipe and welded to the 1-in. pipe section. To the horizontal portion of the L was welded a 1-in. by ¼-in. strap (7) drilled at the outer end for the attachment of a long, threaded vertical rod (8). Latter rod was passed through a hole drilled into the throw of the lever switch (9), which stops and starts the live conveyors feeding the accumulator. Nuts threaded on the vertical rod provide a control adjustment for regulating the movement of the switch lever.

When an adjustable collar with a slotted extension (10) was attached to the vertical section of the L and hooked onto a coil-spring (11) suspended from the slotted strap (3), the assembly was ready to function.

Here's how assembly operates: Control unit—(A) in top sketch—is placed under the hinged center of the gravity conveyor (B). When a load of cases accumulates on a conveyor, the weight extends the spring on the control, thus lowering the control rod to actuate the switch and thereby stop the motor (C) that drives the live conveyors.



When cases are removed from the gravity conveyor, the spring then lifts the telescope-type assembly to close the switch and start the motor driving the feed conveyors. —*Piers Champman, Plant Mechanic, Buckfield Packing Co., Buckfield, Me.*

FOOD ENGINEERING

(Formerly Food Industries)

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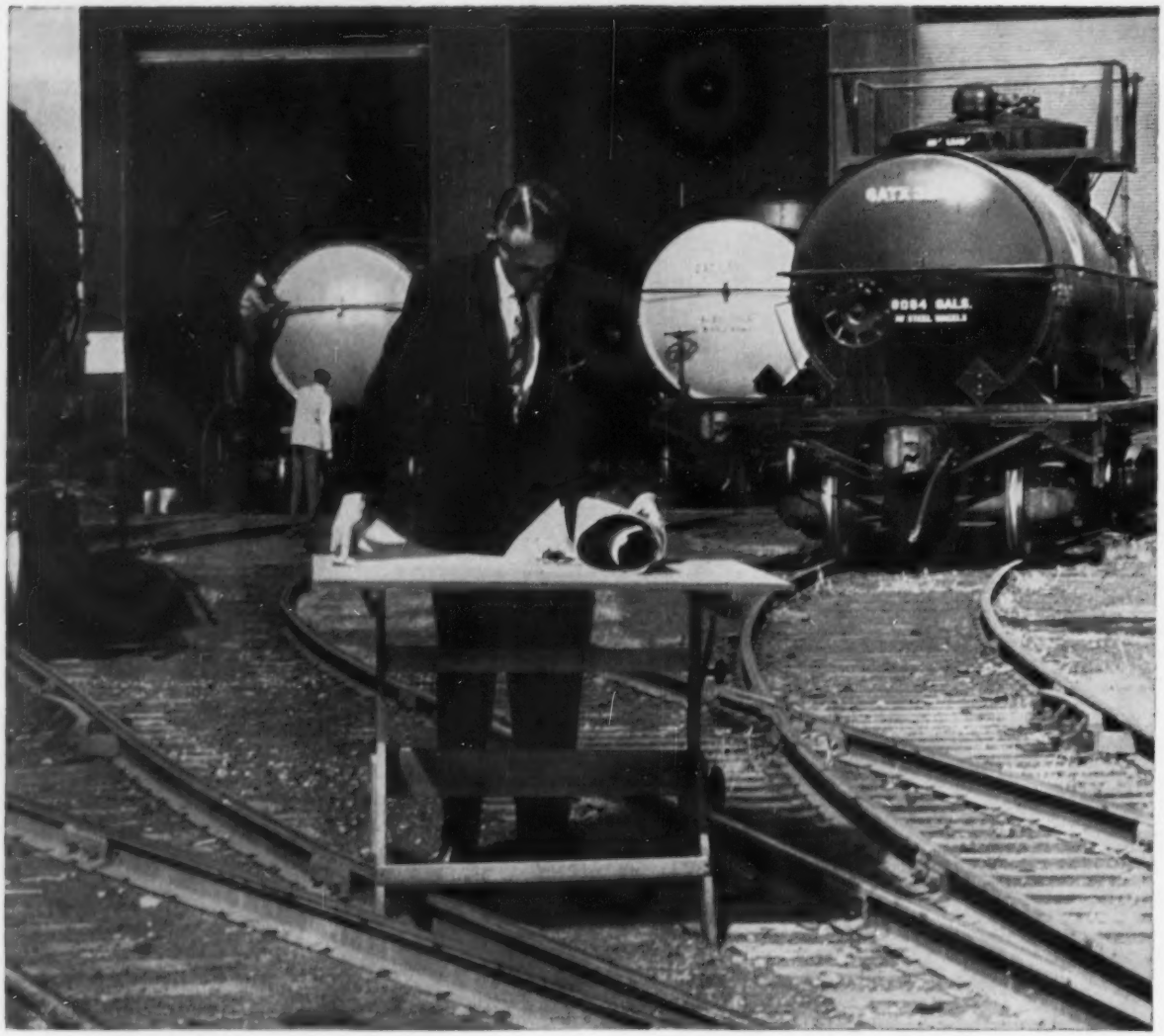

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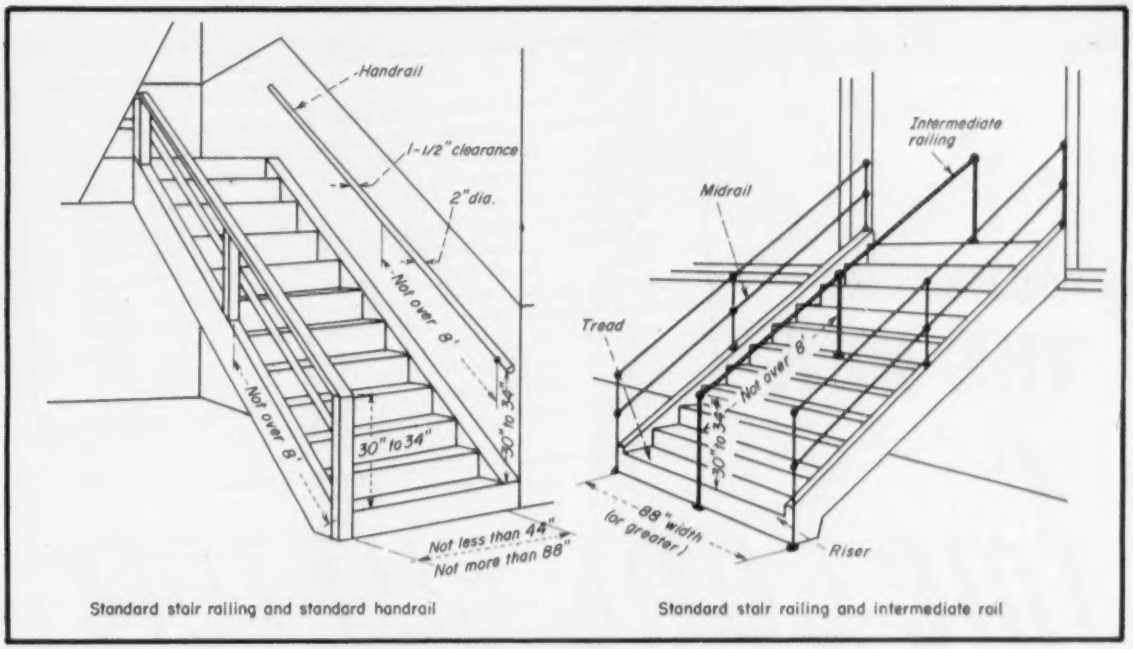
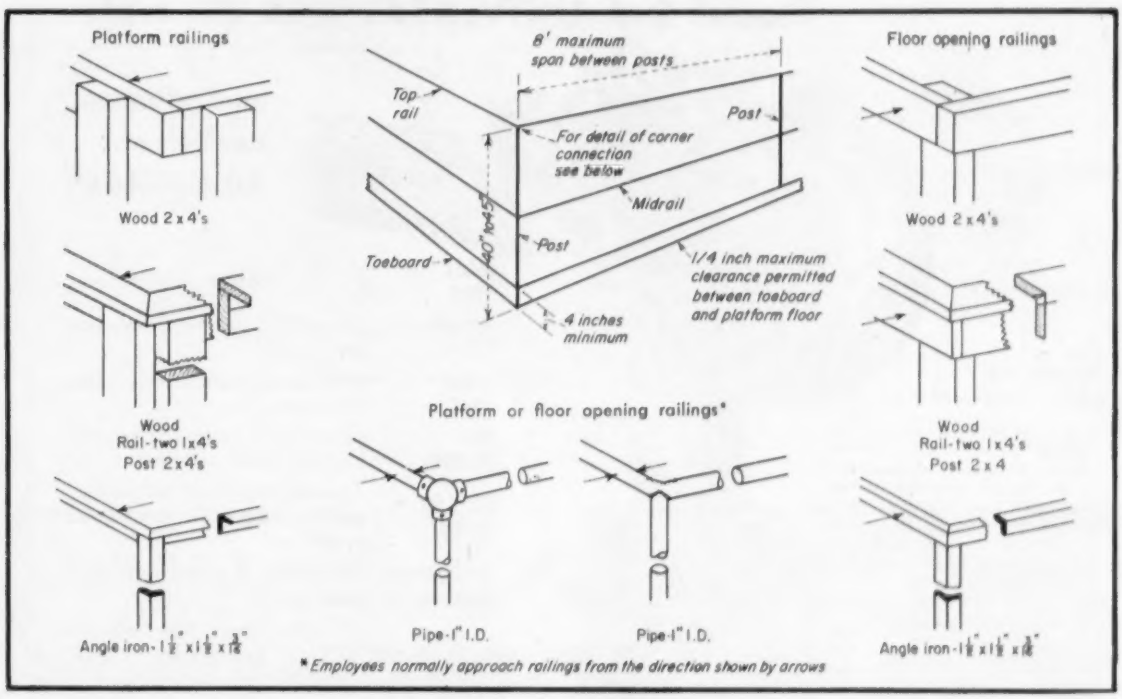


Finished rails—wood (left), metal (right)



Closeup details of rail structures

For Stair and Rail Safety

Here described and illustrated are California's stair and railing specifications and regulations for employee safety, provided as a guide for any and all food plants.

Treads and Risers

In a flight of stairs, variation in height of any two risers, or variation in depth of any two treads, must not be more than one-half inch. According to the California formula, height of riser and depth of tread should total approximately 17½ inches. Here is a handy table:

Riser in inches	Tread in inches	Resulting slope of stairway
5	12½	22°–00′
5¼	12¼	23°–14′
5½	12	24°–38′
5¾	11¾	26°–00′
6	11½	27°–33′

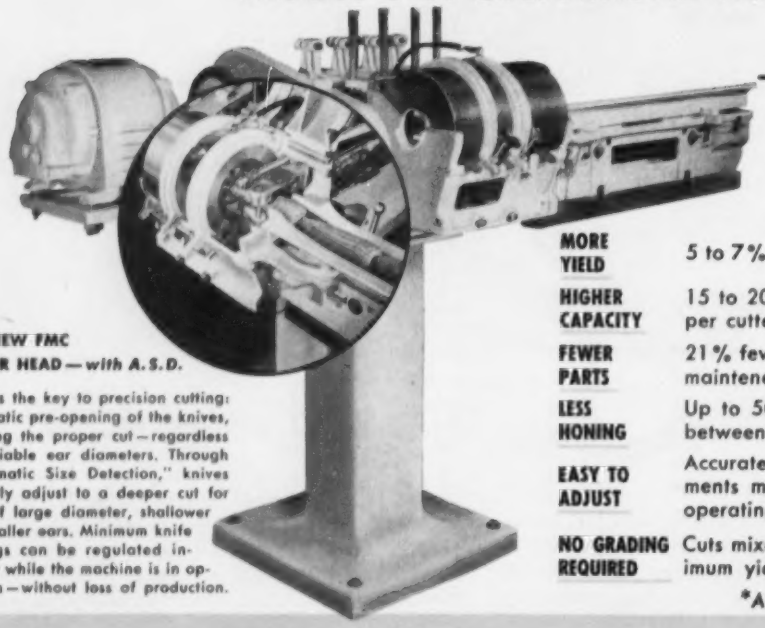
(Turn page)

Now Available—

THE NEW fmc CORN CUTTER

Model 3-A UNIVERSAL with A.S.D.*

The Model 3-A Corn Cutter introduces an entirely new concept of cost-saving automation. It is unequalled for high yield and quality of cut. Proved through thousands of hours of actual operation, this is the first major advancement in corn cutters since the FMC Universal Model No. 2—the machine in widest use today. Here is the cutter with the all-new A.S.D. —"Automatic Size Detection," a unique system of pre-opening knives, which cut both large and small ears close and clean without the need for size grading or constant machine adjustment. Other new features: fewer cutter head parts; simpler and more accurate cut adjustments; easier to clean; automatic lubrication. The Model 3-A affords packers an unusual opportunity of major increases in plant profits through improved cut corn recovery at lower cost per ton.



ALL-NEW FMC CUTTER HEAD—*with A.S.D.*

Here is the key to precision cutting: automatic pre-opening of the knives, assuring the proper cut—regardless of variable ear diameters. Through "Automatic Size Detection," knives instantly adjust to a deeper cut for ears of large diameter, shallower for smaller ears. Minimum knife settings can be regulated instantly while the machine is in operation—without loss of production.

—and all these exclusive ADVANTAGES

MORE YIELD	5 to 7% greater yield per ear!
HIGHER CAPACITY	15 to 20% greater production per cutter!
FEWER PARTS	21% fewer parts—for reduced maintenance!
LESS HONING	Up to 50% more cutting time between knife honings!
EASY TO ADJUST	Accurate depth control adjustments made while machine is operating!
NO GRADING REQUIRED	Cuts mixed ear sizes with maximum yield!

**Automatic Size Detection*

fmc Key to food equipment

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Riser and Tread Table (Cont'd)

6¼	11¼	29°–03′
6½	11	30°–35′
6¾	10¾	32°–08′
7	10½	33°–41′
7¼	10¼	35°–16′
7½	10	36°–52′
7¾	9¾	38°–29′
8	9½	40°–08′
8¼	9¼	41°–44′
8½	9	43°–22′
8¾	8¾	45°–00′
9	8½	46°–38′
9¼	8¼	48°–16′
9½	8	49°–54′

Specification for Stair Railings and Handrails

In standard stair railings and standard stairway handrails, distance between top of the highest rail and top of tread must be 30 to 34 inches (measured vertically in line with face of riser).

Except for height requirements and for fact that a midrail is not required on stairways 30 inches or less in width, a standard stair railing must be constructed like a standard railing. However, midrails are required on all spiral stairways or stairs, regardless of width.

Upper end of handrails or stair railings must extend to vertical plane of top riser; lower end may stop at any vertical plane between the bottom two risers.

Stairway handrail brackets must be spaced no farther than 8 feet apart.

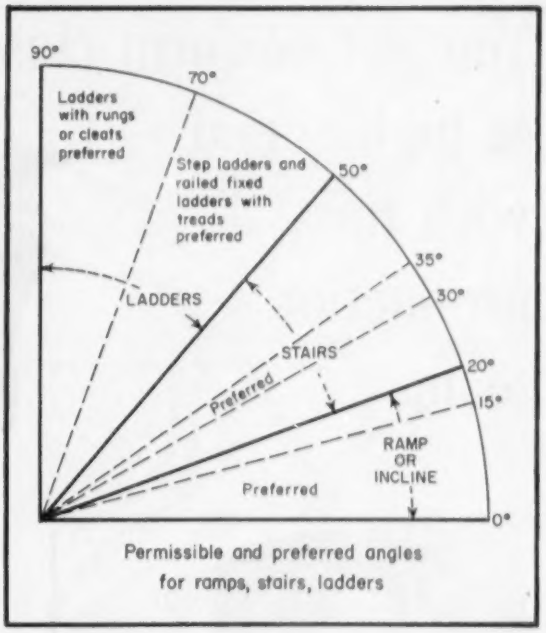
Standard stairway handrails must be made of at least 1-inch nominal inside diameter metal pipe, at least 2-inch diameter wood, or other materials giving equivalent bending strength and protection.

Clearance between stairway handrail and wall or partition must be at least 1½ inches.

Standard Railings

A standard railing consists of a top rail, midrail and vertical posts.

Vertical posts must be spaced no more than 8 feet apart.



Permissible and preferred angles for ramps, stairs, ladders

Top of the highest rail must be from 42 to 45 inches above floor, platform, runway, or ramp, and must be smooth throughout length of rail.

Midrail must be about halfway between top rail and floor surface or toeboard.

Rails must not project beyond the end posts unless extension is not a hazard.

Railing members must be so put together as to give greatest support and protection. For example, when a top rail is made of angle iron, outside face of the vertical leg must be located on railing side that employees normally approach.

Where platform, runway, or ramp is 6 feet or more above places where employees may pass, railings must have a toeboard at least 4 inches high.

Speeds Batch Transportation

Transporting shelled raw goobers from warehouse to peanut butter processing area and elevating them into the hopper that feeds them into the process was both time-and-labor consuming.

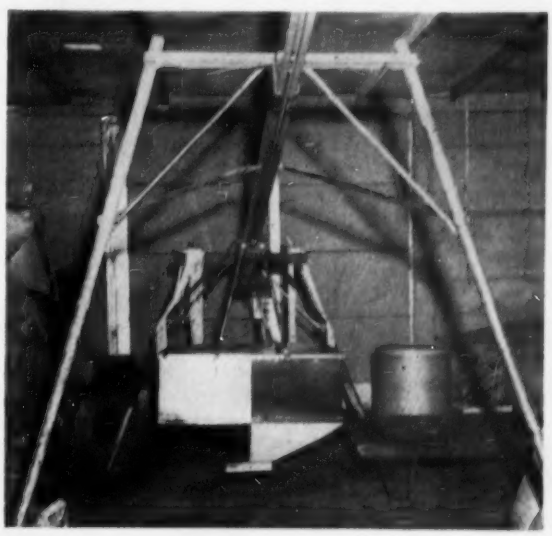
But then we installed an efficient, and not-too-complicated or expensive, handling system.

Here's how the handling system was constructed and operates:

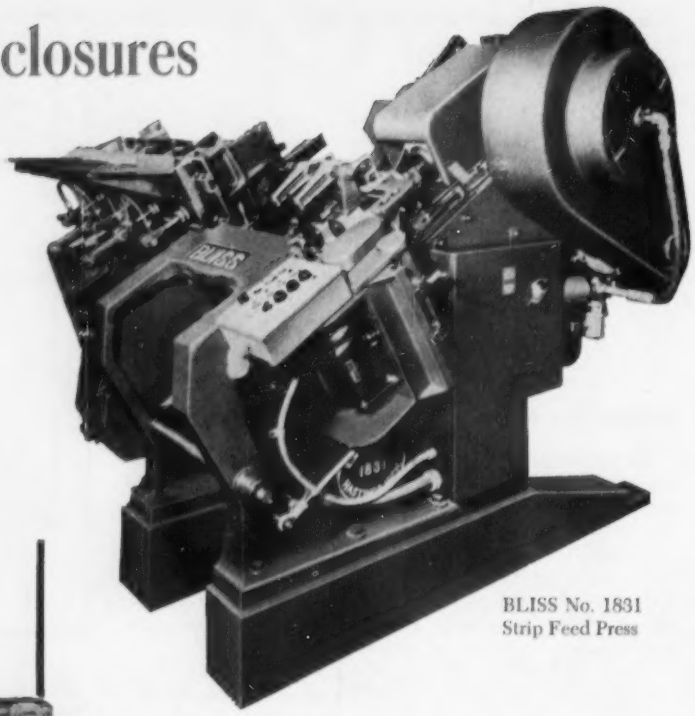
A bin (see photo) was fabricated out of sheet metal and suspended by tubing from the "truck" of a tramrail-type conveyor. Tramrail, an enclosed type, extends from the warehouse up an incline to clear equipment in the production area and arrives above the top of the production line feed hopper, flow from which is by gravity.

Here, just above and beyond the hopper, is located the fractional horsepower motor which drum-winds the cable to pull up the loaded bin. The motor is push-button-controlled from an elevated platform commanding a view of the production area.

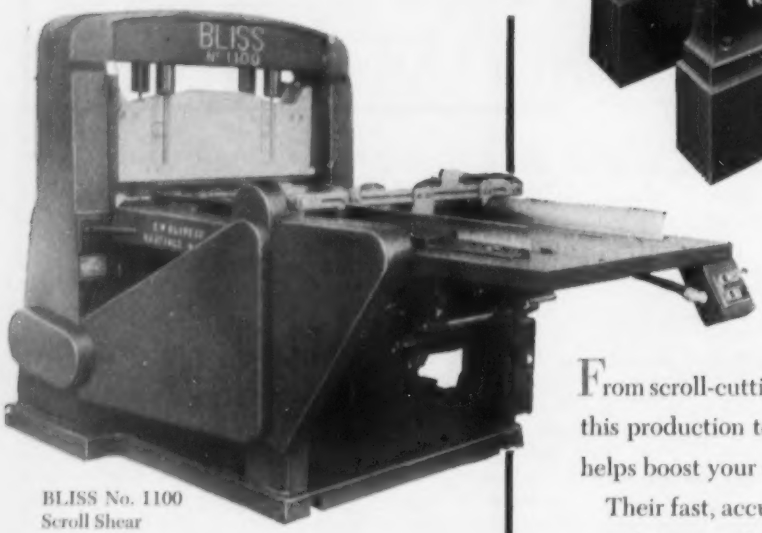
Several safety guards are built into the system. The con-



You get uniform closures at high speed with this production team



BLISS No. 1831
Strip Feed Press



BLISS No. 1100
Scroll Shear

From scroll-cutting tinplate to forming closure blanks, this production team gives you **uniform closures,** and helps boost your output while cutting costs.

Their fast, accurate feeds, for example, give you the speed you need. The counterbalanced slides... counterbalanced crankshafts... fast, smooth clutches—all these assure you of close-tolerance blanking, forming and scroll-cutting **for every run.** What's more, long gibbed slides and guides protect your dies.

You get long service, too, because of their rugged design. The massive bases are heavy; the frames are solid and rigid; both are cast of sound-deadening Meehanite. Thus you get the smooth, accurate scroll-cutting and the precise blanking and forming that increase die life. In short, the accuracy's built in and it stays in **year after year.**

When so much depends on uniform closures, it makes sense to depend on Bliss. To get more information on Bliss' high-speed scroll shear and strip feed press, write for Sections 1 and 2, Catalog 36-B.

BLISS
SINCE 1857

E. W. BLISS COMPANY
Can Machinery Headquarters
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CAN MACHINERY FACTORY
Hastings, Michigan

BLISS is more than a name ... it's a guarantee

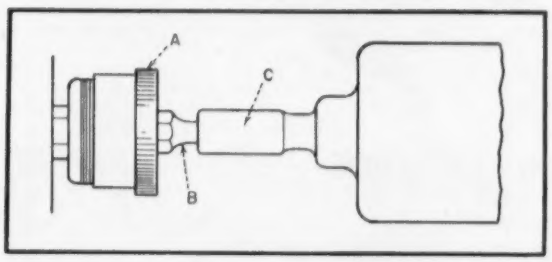
veyor bin is painted in red and white checkers to make it obvious when in motion. And limiting switches stop the motor at the time when the bin arrives at either end of its journey.

Also, while the motor is in operation, either lifting the filled bin or lowering it for reloading, a warning horn operated from the motor circuit is sounded to advise all in the operating area that the bin is in motion.—*C. F. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdell, N. Y.*

Tip on Wet-Dust Collectors

When operating at constant pressure drop, wet-dust collectors are more efficient as dust loadings increase, and are substantially independent of the method of introducing water and of its atomization.

Injection of steam corresponds to two or three times that required for saturation. It results, however, in a marked increase in collection efficiency.—Technical Bulletin, General Foods Corp.



Improved Grease-Cup Filling

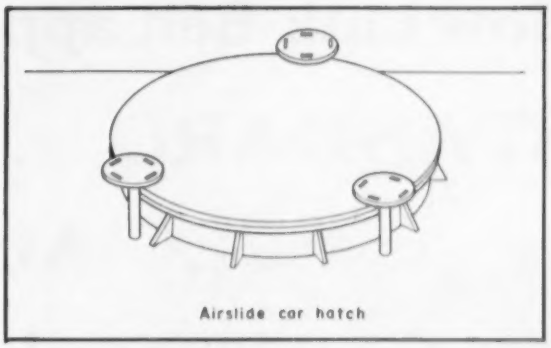
The usual method of filling screwed-down type grease lubricators (where they are still in use) is for the maintenance man to carry a container full of grease to the greasing point.

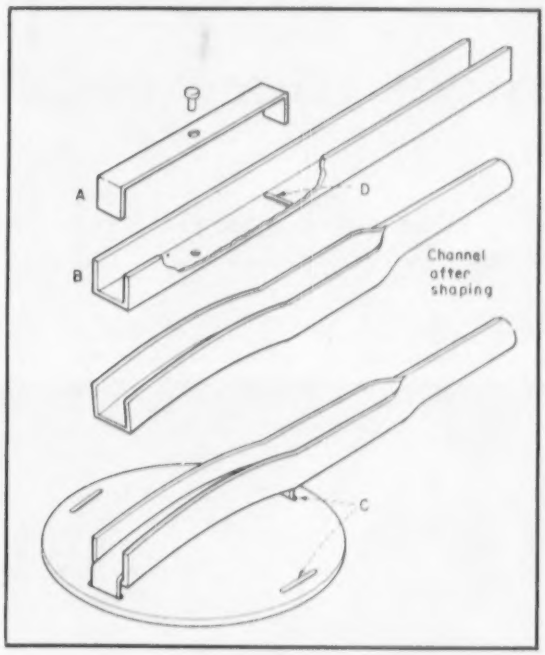
Each cup is then unscrewed from the lubricator and filled, usually by means of a piece of metal strip that serves as a spoon.

But this results in waste of grease—smeared on the fingers of the maintenance man and squeezed out of the cup before the cap threads are engaged.

Better way—quick and clean—of filling old type grease cups that can't be replaced by Alemite types demands only scant modification of the caps. As seen at (A) in sketch, each is drilled and tapped in the center to take a nipple (B) to which a grease gun (C) can be attached.

Sufficient grease to fill many cups can be carried in one large gun for clean and speedy filling.—*Clifford T. Bower, Tool Engineer, London.*


Airslide car hatch



Special Car-Hatch Wrench

On an Airslide car, the hatches (see top sketch) are held down by three dogs spaced at 120 deg. around the circular lid. And to make an effective seal, these have to be quite tight—so tight that it takes considerable strength to loosen them by hand.

But exerting this much "twist" while on top of a car is dangerous. For when the handwheel suddenly is loosened, the man may lose his balance and fall off the car.

To eliminate this hazard and make the hatch opening job much easier, we designed and fabricated a very simple and effective wrench from scrap material on hand. Em-

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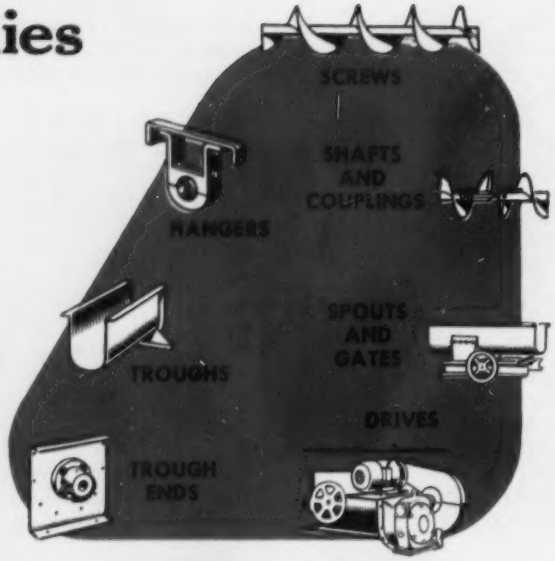
Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

MAY PRACTICAL IDEA WINNER was "Water Cooled Easily at Low Cost," sent in by Raymond Coffeet, Department Foreman, Sunflower Coop Creamery, Everest, Kan.

How Link-Belt applies STANDARD or SPECIAL screw conveyors to meet your needs



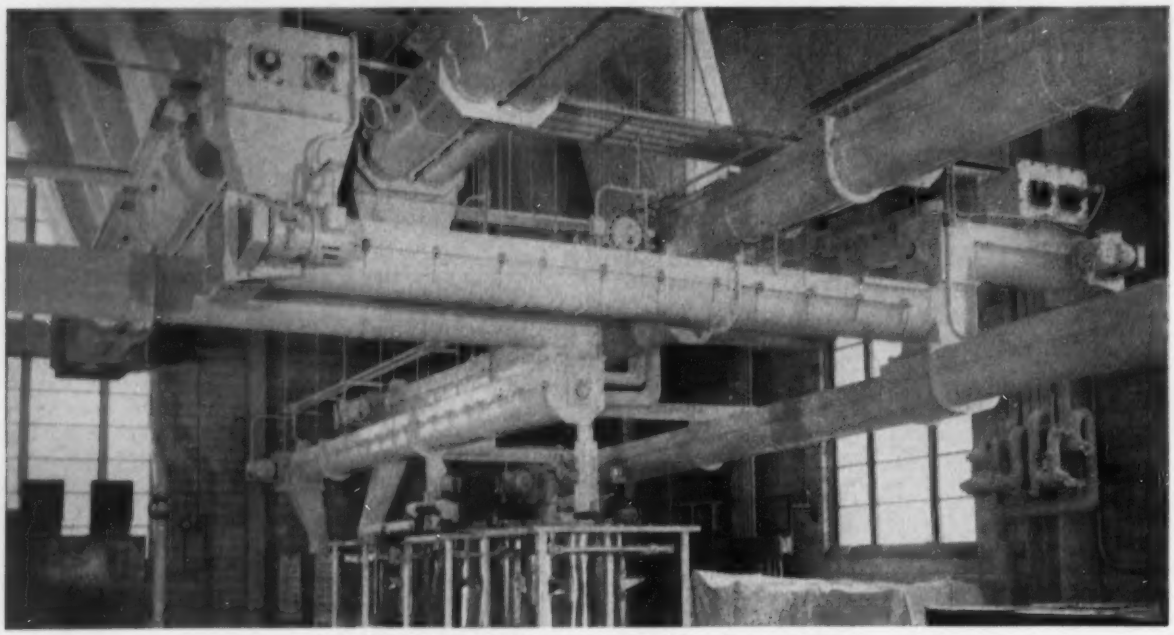
This 4-phase service saves you time . . . spares you details

ANALYSIS AND ENGINEERING service is provided by a district sales office in your area. From long experience, Link-Belt District Engineers can quickly ascertain the best conveying arrangement for you.

COMPLETE LINE OF SCREW CONVEYOR COMPONENTS and related elevating, conveying and power transmission equipment is your assurance that specific needs are fulfilled efficiently and economically.

EASY ERECTION is achieved because of pre-fitting, match marking, close-tolerance manufacturing and Link-Belt drawings. Link-Belt will handle erection if you wish.

SATISFACTORY PERFORMANCE is assured when you rely on Link-Belt as a single contract source for your complete system. We will accept full responsibility for placing it in operating readiness.



At Midwest bakery, Link-Belt twin screw feeders and screw conveyors provide sanitary handling of sugar and flour to bins and sifters.

Extensive engineering experience has provided Link-Belt with standard solutions to specialized screw conveying requirements. In addition, local availability of Link-Belt engineering service and quality components assures prompt, efficient action. That's why—whether you plan a complete new system or improvement of present arrangements—a call to your nearest Link-Belt office is a sure step to lower handling costs.

LINK-BELT

SCREW CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 15); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,912

ployed was a 1-ft. length of 1x1x1-in. aluminum channel—(A) in second sketch—one end of which was shaped to form a rounded handle.

Next, a 7-in. length of $\frac{1}{8}$x$\frac{3}{4}$-in. steel flat stock (B) was bent at ends to fit the slot in the hatch closures (C).

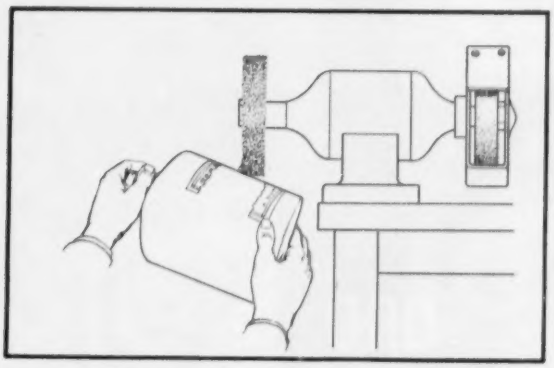
Then a slot (D) was cut in the bottom of the channel so that, when the bent end of the steel strap fits over the end of the channel, the other bent end will pass through the slot.

In this position, the bent steel is attached to the aluminum channel by a stout $\frac{1}{4}$ in. rivet.

This wrench will readily loosen the closures on the hatches without endangering the operator.—*W. C. McCullough, Maintenance Man, Coca Cola Co., Los Angeles.*

Toward Accident Prevention

Along traffic lanes and in areas where workers congregate are strategic locations for safety posters. Safety decals (see arrows in photo) placed on dispensers provide effective reminders without marring appearance of the equipment. —*Fred Barker, Personnel Director, Seabrook Farms Co., Bridgeton, N. J.*



Speedy Label Remover

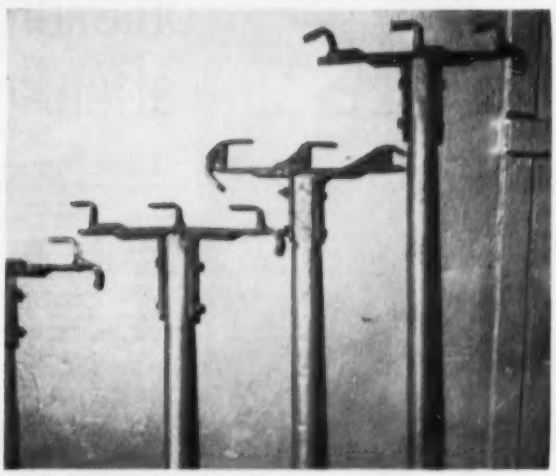
Throughout the food industry, many containers such as 1 gal. and $\frac{1}{2}$ gal. jugs are re-used. One drawback to this is the difficulty of removing the labels from the jugs.

Soaking will loosen some, while others adhere so tightly they defy removal except by scraping.

The fastest and safest method of removing jug labels is through the use of a wire brush mounted on the shaft of an electric motor. Most food plant shops have an electric grinder, the grinding wheel of which is easily replaced with a stiff wire brush such as used for removing burrs from metal.

By holding the jug firmly but lightly against the rotating brush the label is easily removed.

A screen of canvas may be placed behind the setup to catch the bits of paper.—*Kirby M. Hayes, Professor, University of Massachusetts, Amherst.*



Strengthens Rack Handle

In improving the tray-rack (top photograph) for loading our freezers, we also improved the method of loading and unloading the units.

A rod with three metal hooks attached to one end is used to push three trays into the freezer at a time, or slide three from the freezer to the rack when unloading the freezer.

To minimize fatigue of those responsible for loading and unloading tray racks, the lightest possible construction was necessary.

Steel rods had ample strength, but they were too heavy. Wood shafts and hollow aluminum tubes were light enough, but their breakage was too costly.

However, inserting a wood center in the hollow aluminum tube (second photo) made a handle amply durable and sufficiently light—*John Emmons, Production Supervisor, and Harold Martin, Project Engineer, Seabrook Farms Co., Bridgeton, N. J.*

It breaks in LIFE July

announcing

ACRONIZED*

and a history-making development bringing you

a really fresh chicken ...time after time!

Your first taste tells you this is one of the freshest, tastiest chickens you've ever eaten!

And it is because it's an ACRONIZED chicken!

Acronized poultry is the result of a great new technical development in the processing of fresh-dressed poultry. It is an entirely new method of processing the birds while they are chilling for shipment, that protects their freshness right to your dinner table.

You get not only more wholesome poultry, but you get it consistently... time after time!

For Acronized poultry is the triumphant achievement of years of research into the factors that maintain freshness. It brings you chicken at the very peak of its taste and flavor — the greatest improvement in food processing since the coming of refrigeration.

Chances are, unless you're a lot of lucullus boy or farmer's daughter in your background, you've never eaten chicken as good.

Every Acronized chicken, whether whole or cut-up, carries the Acronized seal. Look for it on the breast at your favorite food store — if they don't have it, they can get it for you.

And no matter how you serve it — broiled in butter, roasted, fried, or stewed in a tasty casserole, you and your family will find your Acronized bird the most heavenly chicken on earth!

*Trademark of Agricultural Economics Institute

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smashing full-color campaign to build national demand for ACRONIZED* POULTRY

These great consumer magazines will carry the mouth-watering appeal of Acronized chicken into America's homes from coast to coast, starting this month and *continuing* in the greatest campaign the industry has ever seen, to expand consumer demand for Acronized poultry.

Perhaps you already have 100% of your production on Acronized chicken. Or possibly you've only recently been franchised and aren't yet rolling. Or maybe you've just been *thinking* about looking into this revolutionary new process that maintains the freshness of fresh-killed poultry.

Whatever your situation, on the basis of actual test promotions, you can be sure of one thing—

In the next few months you are going to see the consumer demand for Acronized poultry burst forth and make industry history.

Consumers want Acronized poultry because it is *consistently* fresh and tasty. Retailers want it for its *operational* economies. But only you can supply it, because Acronized poultry is sold only through franchised processors.

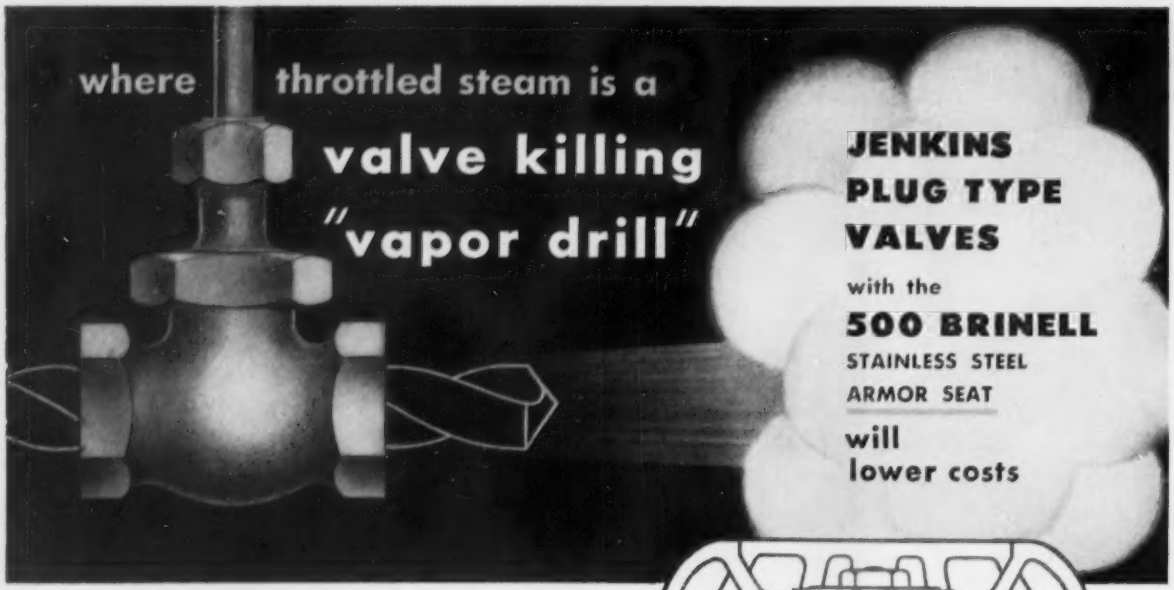
For information on how your plant may qualify, write:

AMERICAN CYANAMID COMPANY
Food Industry Department, 30 Rockefeller Plaza, New York 20, N. Y.

**ACRONIZED is a trademark of American Cyanamid Company*

ON → ACRONIZED* → POULTRY!

*Trademark of AMERICAN CYANAMID COMPANY



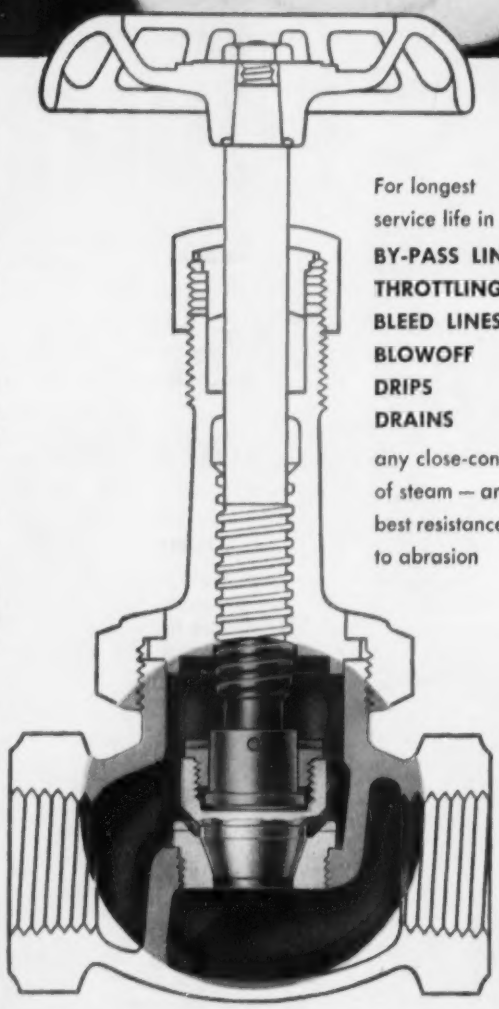
Closely regulated steam erodes grooves in seating units and drastically cuts service life of ordinary valves.

Jenkins Plug Type Valves have been engineered in every detail for maximum wear in such valve-killing service. The stainless steel Armor Seat defies the "vapor drill", and Jenkins quality throughout gives them top rating for wear-proof and trouble-proof perfomance.

Make you own test . . . in your toughest steam service . . . or anywhere that abrasion or erosion causes frequent valve failure. Compare, part for part, with any similar valve. You'll find that, again, Jenkins *extra value* pays off in longer life and lower maintenance cost.

Plug and seat ring are Jenkins JX500, a Stainless chromium alloy steel made to Jenkins high strength specifications, heat-treated to 500 Brinell. Seating surfaces are super-hard and mirror-smooth, offer highest resistance to galling, cutting, abrasion, and erosion. Wide, steep, 30° total taper permits extremely close regulation of flow and vapor-tight closure.

The Stainless steel plug is securely fastened to the spindle with a bronze locknut. Spindle is Jenkins specification bronze with a tensile strength exceeding 60,000 lbs., — has high corrosion resistance.



For longest service life in
BY-PASS LINES
THROTTLING
BLEED LINES
BLOWOFF
DRIPS
DRAINS
any close-control of steam — and for best resistance to abrasion

300 lb. 200 lb. 150 lb.
GLOBE and ANGLE

For complete information call your Jenkins Distributor — ask for Form 202-A. Or write: Jenkins Bros., 100 Park Ave., New York 17.

SOLD THROUGH PLUMBING-HEATING AND INDUSTRIAL DISTRIBUTORS

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

Now! New Heavy-Duty V-8's!

With the most GO under any truck hood!

Powered to pace today's traffic!

These new 206, 226, 257 hp. V-8's in the new INTERNATIONAL V-Line have a "built-in" swift response with maximum payload. You get more *go* at lights . . . more "keep going" on the hills with shifting greatly reduced . . . higher average road speeds within legal limits . . . top performance where it's needed most.

In short, the new INTERNATIONAL V-Line is built to set new highs in your profit column!

Tested and proved as no other trucks have ever been!

Developed and tested in the lab, then put through more than 1,000,000 test-track miles, and in 2,500,000 on-the-job miles in 39 different truck vocations.

These tests were made by profit-minded truckers with a gimlet-eye on mileage, hauling time and repair bills. Their conclusions—"GREAT, on every count!"

3 Great new INTERNATIONAL V-8 engines!

	V-401	V-461	V-549
Displacement	400.9 Cu. In.	461 Cu. In.	548.7 Cu. In.
Bore and Stroke	4⅛ x 3¾	4⅛ x 4-5/16	4½ x 4-5/16
Maximum hp.	206 @ 3600	226 @ 3600	257 @ 3400
Maximum Torque	355 @ 1800-2000	420 @ 1600	505 @ 2000

Pressure Controlled-Flo Cooling! Full circulation, fully controlled. Cold weather by-pass.

"Wet" Replaceable Exhaust Valve Guides.

Exhaust Valve Faces and Seats of Stellite.

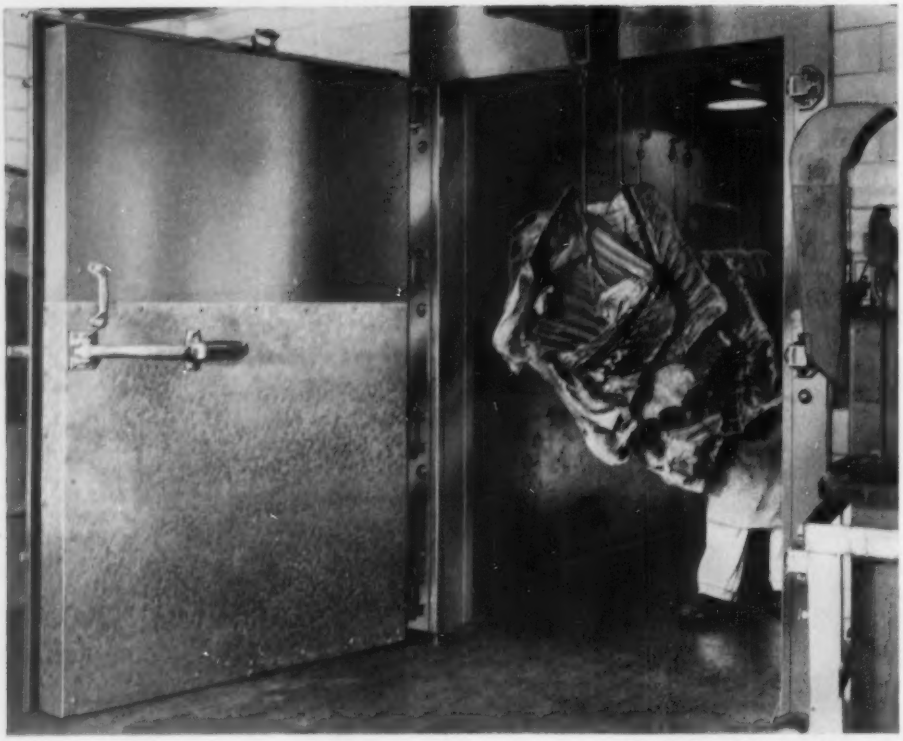
19 Pound Aluminum Flywheel Housing.

Get all the facts behind this great new truck story. Send for booklet "New Heavy-Duty V-8 Power Where You Need it Most." Write INTERNATIONAL HARVESTER COMPANY, P. O. Box 7333, Chicago 80, Illinois, or see your INTERNATIONAL Dealer or Branch.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Truck • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors



HEAVY GAGE METAL CLADDING protects lower part of door against damage as heavy loads move rapidly through extra-wide Jamison Track Door.

Jamison doors provide extra sanitation and durability for beef processor

EASY TO CLEAN and easy to keep clean is Jamison Stainless Steel Clad Track Door, opening into 0° freezing room.

At the busy processing plant of The Central Beef Co., Boston, Mass., a total of 7 Jamison Cold Storage Doors are playing a vital part in this successful operation:

STAIN-RESISTANT door surfaces of stainless steel provide easy, quick cleaning to promote over-all sanitation.

PROTECTION FROM HARD USAGE is gained through sturdy #10 gage kick plates which resist damage from impact, prolong life of door. Kick plates wrap completely around both door and frames.

FASTER HANDLING and increased rate of traffic flow are made possible through Jamison door designs which can accommodate any plant situation.

Whatever unusual door problems you may have, Jamison's experience of half a century can bring you a quick, economical solution. For complete data or engineering assistance write to: Jamison Cold Storage Door Co., Hagerstown, Maryland

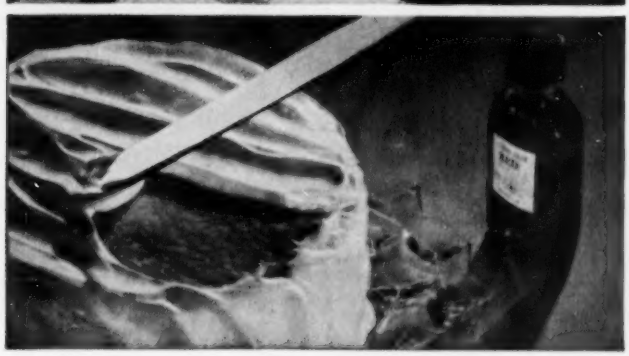
JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

DOW PROPYLENE GLYCOL, U. S. P.

HIGH-EFFICIENCY SOLVENT FOR FLAVORS AND COLORS



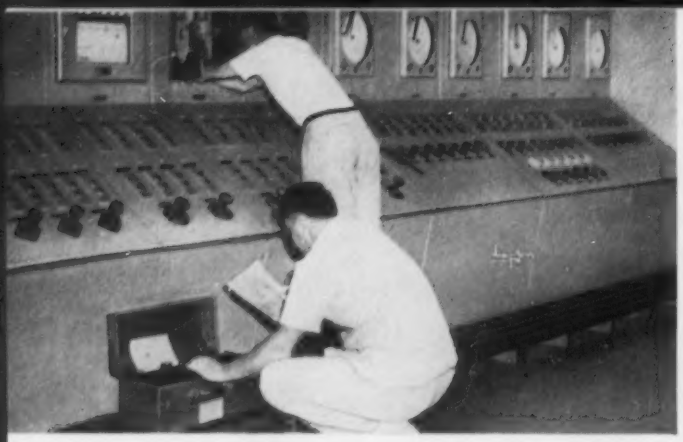
Gaining wide acceptance for versatility and economy . . . a good bet for improving your products, too

Big reason for the wide acceptance of Dow propylene glycol, U.S.P., is its extremely high solvent ability. Natural result of this efficiency is greater economy of manufacture. You'll find these advantages of propylene glycol extending over a wide range of flavoring raw materials, too.

Food colors, emulsified flavors and flavor concentrates also benefit from propylene glycol's excellent solvent action. Many makers of food colors have replaced other solvents with propylene glycol with remarkable savings and only minor reformulation. A big advantage in formulating emulsified flavors is gained by the wetting action of propylene glycol which increases the stability of these emulsions.

The dependable quality and prompt delivery of Dow propylene glycol, U.S.P., can simplify your production and scheduling. For a free sample and property information, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 809E-3.

you can depend on DOW CHEMICALS



Maintenance engineering

You can arrange to have a Honeywell service engineer visit your plant at regular intervals to inspect, clean, and adjust your instruments and controls. He's factory-trained and field-experienced in keeping good instruments in top operating condition. If an emergency should arise, a phone call will bring a Honeywell service engineer to your plant in a hurry.

Spare parts, in a rush

A Honeywell branch office near you can be your storeroom for standard parts . . . in addition, the Parts Depot in Philadelphia carries a complete stock of all normally used parts. With Honeywell stocking your spare parts, you save storage and inventory control costs. Most shipments are made within 24 hours after orders are received.

Service is the

Practical service training

The tuition-free Honeywell Training School teaches your instrument technicians the most up-to-date maintenance methods, fits them for the kind of problems they may encounter on the job. Intensive courses range from two to fourteen weeks.

Application engineering

Experienced Honeywell application engineers know your industry and processes. They design *complete* systems of instrumentation, reducing the work of your own engineering staff. From the broad Honeywell line, they recommend instruments that are exactly right for the job. And because Honeywell supplies all types of instruments, recommendations are made without bias. Service engineers will, if needed, help with installation and startup of your system.

big extra you get with Honeywell instrumentation

Honeywell offers you far more than instruments. You get service whenever and wherever you need it . . . service that begins when you first decide you need instruments, and continues long after they're installed. This service is always conveniently close at hand, for there are more than 110 Honeywell sales and service centers located strategically throughout the U. S. and Canada.

Prompt, competent service by nearby field specialists is an important plus-value of Honeywell instrumentation. Your local Honeywell sales engineer has all the facts on this service as it relates to your instrumentation needs. Give him a call . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

H HONEYWELL

MINNEAPOLIS Honeywell

BROWN INSTRUMENTS

First in Controls

PROTECTION is our business, too

Just as alert police officers guard the safety and well-being of your community—J&L Steel Containers protect your products by providing dependable packaging that assures safety in transportation and storage. Their precise fabrication assures accuracy in all fittings and closures.

J&L drums and pails are chemically cleaned and dried by the JaLizing process. This assures a clean and dry, rust-inhibiting surface and increases the adherence and durability of decoration and interior lining.

Special protective interior linings are available to provide the best possible packaging for your products.

Jal-Coat, J&L's lithographing process, applies your trademark and sales message to the finished container . . . *no side seam touch-up is ever required.*

Plants located at Atlanta, Ga.; Bayonne, N. J.; Cleveland, Ohio; Kansas City, Kansas; Lancaster, Pa.; New Orleans, La.; Philadelphia, Pa.; Port Arthur, Texas; and Toledo, Ohio.

JaLiner, J&L's integral plastic contour liner, is designed to solve "hard-to-package" problems.

J&L STEEL

Jones & Laughlin
STEEL CORPORATION-PITTSBURGH

CONTAINER DIVISION
405 LEXINGTON AVE., NEW YORK 17, N. Y.

Morton Salt Company's new million dollar laboratory at Woodstock, Illinois, is at the service of the Food Industry to help solve problems relating to salt.

"They don't taste the same as last time"

Too salty? Not salty enough? The Morton Salt method for testing salt content on potato chips helps control flavor.

Now chippers can check the consistency of their salting operation and maintain the ideal percentage of salt on chips that their customers prefer. It's easy to do with a Morton Salt Content Testing Procedure and Color Standard Stirring Rod.

The Morton procedure is fast and accurate. It is simple enough so that almost anyone can be taught to conduct it. And it makes it possible to turn out chips that are consistently appealing in taste and texture. Morton also helps with problems in flavor control with the right grade of salt for any operation.

How Morton can help you make a better product

Chances are Morton can help you turn out a better product for less money if you use salt for canning, packing or processing any food product. For Morton makes many grades of salt for the Food Industry, and only Morton has 9 strategically located plants to serve you. We offer fast delivery from a bag to a trainload at favorable prices and freight, *anywhere* in the country.

What's more, one of Morton's Food Technologists can assist you with on-the-spot help with any problem you have pertaining to salt. And he's backed by the services of chemists and salt scientists at Morton's ultra-modern research laboratory.

☐ Please send me your free Testing Procedure and Color Standard Stirring Rod for use in determining the salt content on potato chips.*

☐ I am not a chip packer but would like more information on how Morton can help me _____

Name _____

Title _____

Company _____

Street _____

City _____ Zone _____ State _____

*Glassware and chemicals necessary may be obtained at a nominal fee from the Natl. Potato Chip Institute.

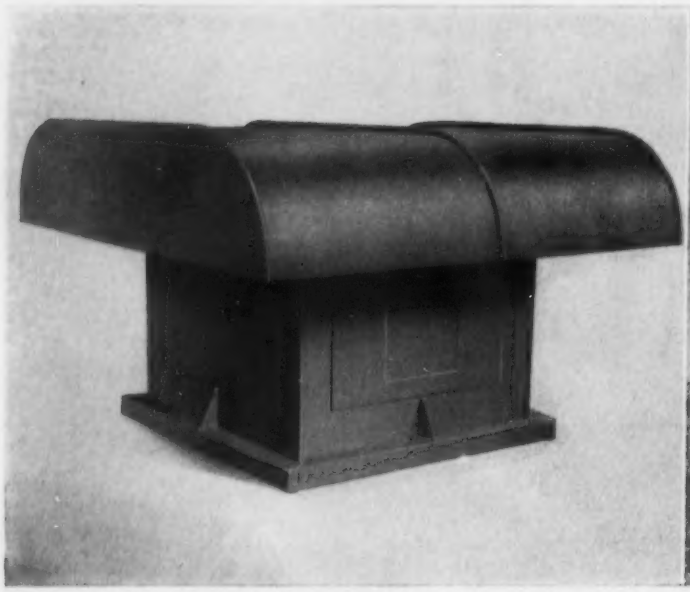
MORTON SALT COMPANY
INDUSTRIAL DIVISION
Dept. FE-7, 120 So. La Salle Street, Chicago 3, Illinois

For more data, circle this page number on card at front →

"Buffalo" SKY-VENT ROOF VENTILATORS

CAPACITIES: 1,000 cfm through 250,000 cfm

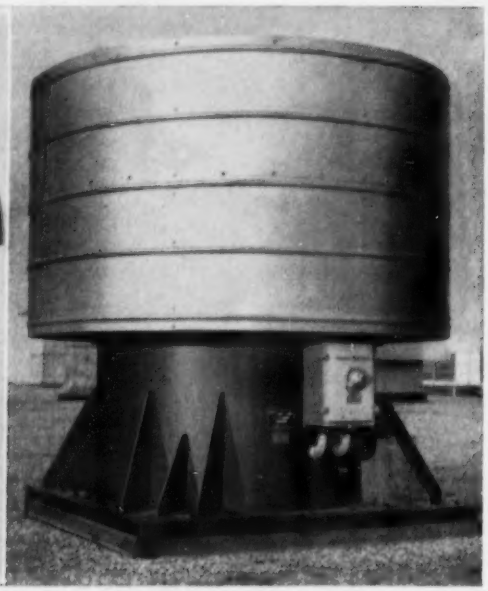
SIZES: 12″ through 120″



Style "H" Sky-Vent

The Style "H" Sky-Vent head is made of heavy gage galvanized steel with integrally rolled stiffening flanges along its entire length and is internally braced with one-piece welded square hollow tubular frame. Hood design minimizes friction loss as air leaves unit.

The extra heavy galvanized steel stack with integral flanged curb plate has offset stiffening panels rolled into the side sheets and on larger sizes is further braced with one-piece welded square hollow tubular frame. Gravity, manual or motor operated shutters are available, mounted in the stack. Disconnect switch and internal wiring can be provided.



Style "V" Sky-Vent

Counterbalanced dampers open when fan starts, close by gravity over V-shaped trough at top of inner cylinder when fan is shut off. Heavy gage stack contains integrally welded gussets supporting motor and propeller fan. Outside gussets provide rigidity, minimize vibration. For easy installation, a flanged roof curbing plate is welded to the stack.

"Buffalo" high volume power roof ventilators are designed to ventilate large plant areas not adjacent to outside walls or where expensive and bulky duct work is impractical. This type of ventilation lends itself well to rearrangement of plant layout without consideration for the ventilating system.

The "Buffalo" Propeller or Axial Type Fan in the stack has all the strength, efficiency and smooth operation that characterizes the "Q" Factor* in all "Buffalo" Fans. Recently introduced, these new units are being adopted by many of the country's largest plants for removing hot air, fumes and fogs from large areas. Why not investigate? Write today on your company letterhead for Bulletin FM-1234 and other descriptive material.

The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

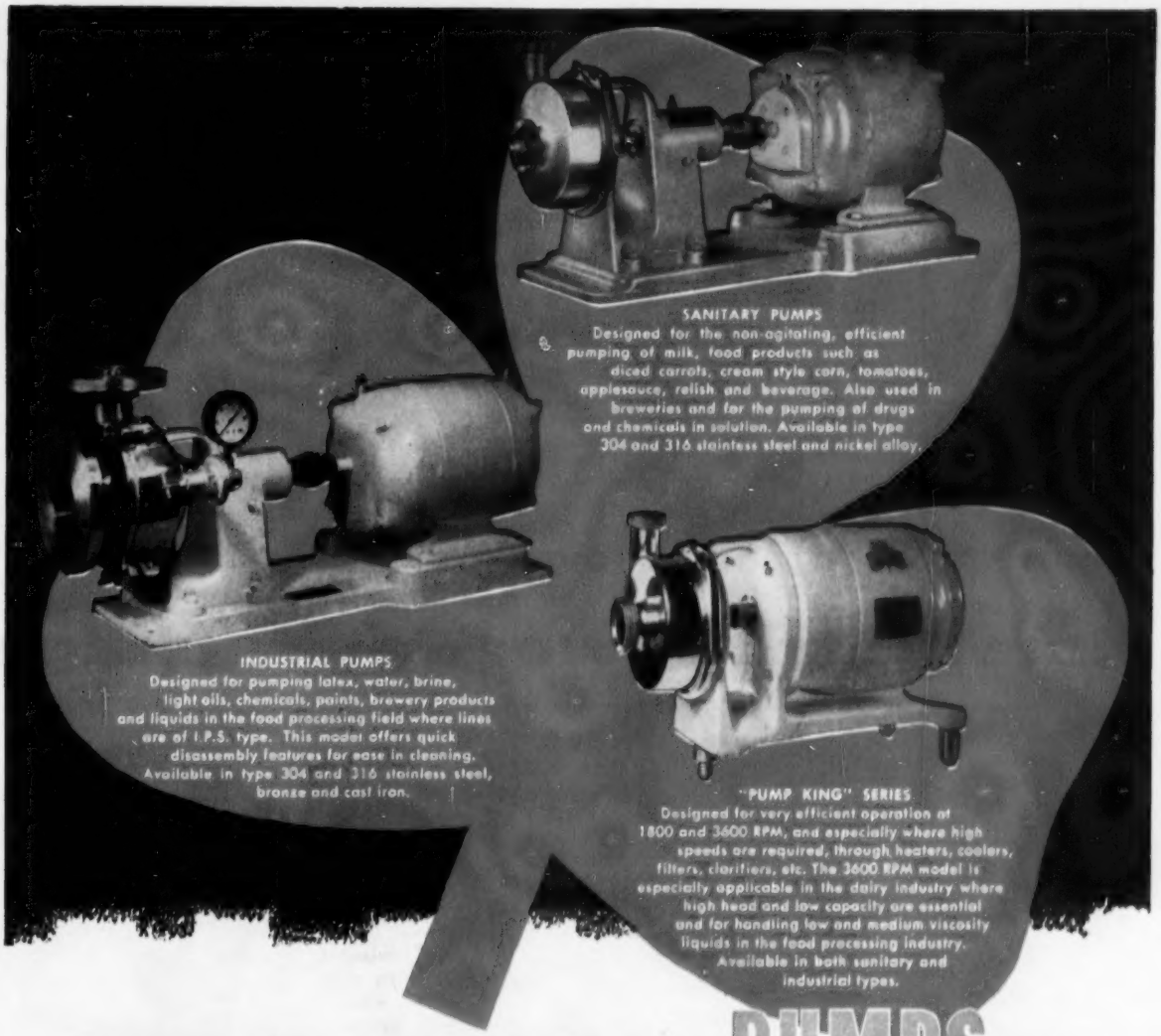
BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

INDUSTRIAL EXHAUSTERS | BELTED VENT SETS | PROPELLER FANS | "E" BLOWERS - EXHAUSTERS


SANITARY PUMPS
Designed for the non-agitating, efficient pumping of milk, food products such as diced carrots, cream style corn, tomatoes, applesauce, relish and beverage. Also used in breweries and for the pumping of drugs and chemicals in solution. Available in type 304 and 316 stainless steel and nickel alloy.
INDUSTRIAL PUMPS
Designed for pumping latex, water, brine, light oils, chemicals, paints, brewery products and liquids in the food processing field where lines are of I.P.S. type. This model offers quick disassembly features for ease in cleaning. Available in type 304 and 316 stainless steel, bronze and cast iron.
"PUMP KING" SERIES
Designed for very efficient operation at 1800 and 3600 RPM, and especially where high speeds are required, through heaters, coolers, filters, clarifiers, etc. The 3600 RPM model is especially applicable in the dairy industry where high head and low capacity are essential and for handling low and medium viscosity liquids in the food processing industry. Available in both sanitary and industrial types.

These efficient Tri-Clover PUMPS can pump any product that will flow to them . . .

ANY product that will flow to them can be handled efficiently and economically with Tri-Clover non-agitating centrifugal pumps. Illustrated are just three of the many Tri-Clover pump models used extensively in food processing, brewing and bottling, chemical process and general industrial applications. Pumps are available in stainless steel, nickel alloy, bronze and cast iron.

Designed for efficient liquid transmission and low cost maintenance, these pumps have many exclusive features, among which are—patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications, including inert carbon rotary seals for sanitary application, packing gland seals, water cooled seals and seals for latex handling.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.

See your nearest TRI-CLOVER DISTRIBUTOR

EXPORT DEPT., 8 So. Michigan, CHICAGO, U.S.A.

SEND FOR THE TRI-CLOVER PUMP CATALOG — ***One of the most complete, useful pump catalogs ever compiled. Contains engineering data on all types of pump applications. Write for your copy of Catalog 253 today.***

LADISH CO.

Tri-Clover Division

Kenosha Wisconsin

TRI-CLOVER

For more data, circle this page number on card at front →

How Famous Brands Prove . . .

More Sales Power Per Package

Remember, Waxed Glassine is more than a wrapper. It billboards your brand, merchandises itself, sells itself. Waxed Glassine is an advertisement with genuine appetite appeal. In fact, *it's an appetizement!*

...with WAXED GLASSINE

Modern packaging, distinctive design, superior protection at minimum cost! Waxed Glassine sparks instant brand recognition, inspires consumer confidence in product freshness and quality!

THE POWER OF WAXED GLASSINE OUTER WRAPS:*

- **More eye appeal** Sparkling clean surface provides perfect background for brilliant, contrasting colors, makes the most of appetitizing illustrations, lets you use entire package for powerful all-over sales-winning designs that prompt purchase by brand! Waxed Glassine comes in many weights, many colors—one just right for the job in mind!
- **Billboards your brand** Every package is a *billboard* in the store and in the home, generating impulse sales and assuring repeat customers with its fresh, inviting look, strong appetite appeal, stand-out brand identification and proven selling features!

INNER AND OUTER WRAPS OF WAXED GLASSINE:

- **Extra flavor protection** Safely seals in all that desirable just-made goodness, keeps customers coming back for more. And satisfied shoppers mean satisfied retailers!
- **Extra freshness protection** Self-sealing Waxed Glassine protects against moisture invasion, maintains freshness and texture best for longer shelf and pantry life. Easier to open, easier to reclose, contents keep fresh and tasty for the life of the package!
- **Extra grease protection** Waxed Glassine wrappers resist penetration by fats, oils, shortenings. No more rancidity problems! Your package stays clean, inviting, colorful!
- **Extra strength** Waxed Glassine passes every rugged test of delivery, in-store and consumer handling! Made stronger to stack better, it cuts down crumbling, breakage, ripped wrappers and returns that shrink your profits!
- **Low cost** Lower basic costs plus constant, dependable supply team up with other Waxed Glassine advantages to produce a package that reaches out and sells! Results: increased *net* profits for you!

Waxed Glassine teams up with the experience, facilities and service of the nation's top converters, to give you modern packaging and production protection that pays off in bigger packaging business, and the job doesn't stop here!

Traffic-stopping *designs*, actual *samples*, proven *sales ideas*, complete *cost sheets* show how Waxed Glassine pays off in better packaging, bigger brand profits! See your Waxed Paper salesman, or write or telephone us direct.

W
PROTECTS FRESHNESS AND FLAVOR
P

Waxed Paper Merchandising Council, Inc. • *38 South Dearborn Street* • *Chicago 3, Illinois* • *Telephone: STate 2-8115*

TITANIUM can make this basket 50% lighter...

Titanium is only *half* the weight of steel—but it's just as strong. Think what that means in terms of easier-handling equipment—greater efficiency.

And titanium's exceptional resistance to most forms of corrosion means practically unlimited life in the food plant. But, even more important, titanium does not affect food products—it never adds to or subtracts from delicate flavors.

Titanium has all the advantages of steel—high strength, fine finish, easy cleaning—*plus* light weight and superior corrosion resistance. See your REM-CRU representative soon. He'll be glad to furnish full data on how best to put titanium to work for you.

To keep abreast of the latest developments on this vital metal, write to Dept. F-7 for the Rem-Cru Review—a free periodical presenting the latest technical data on titanium alloys.

REM-CRU TITANIUM

REM-CRU TITANIUM, INC., MIDLAND, PENNSYLVANIA

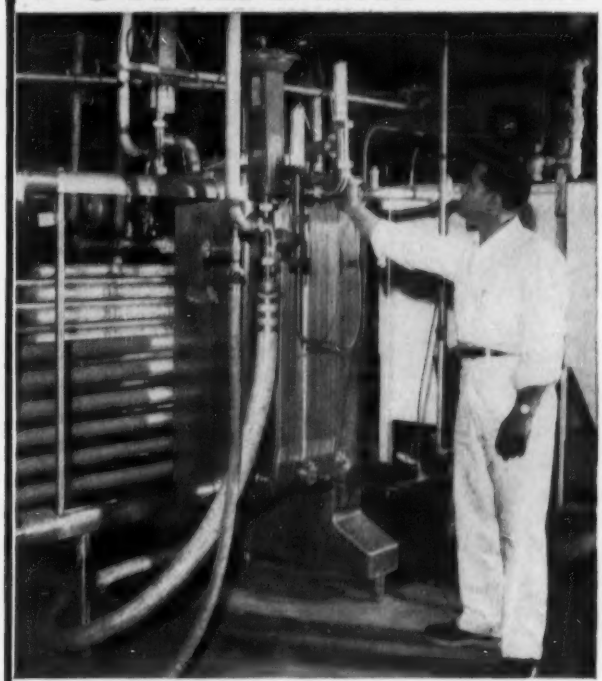
Sales Offices: 3338 South Malt Avenue, Los Angeles 22, California • 4501 W. Cortland Street, Chicago 39, Illinois • 405 Lexington Avenue, New York 17, N. Y.

DE LAVAL PRECISION INSURES PRODUCT QUALITY...

No matter what your plate heat exchanger requirements may be...De Laval gives you unparalleled accuracy . . . pinpoint precision...the quick, sharp response to any demand for temperature change that protects product quality.

No plate heat exchanger has so many advantages in pasteurization, heating, cooling, heat recovery or regeneration. ***Get details...today!***

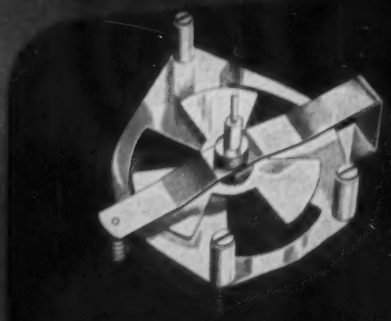
FOR EXAMPLE...



"Our De Laval Plate Pasteurizer is a great help," says famed E. & J. Gallo Winery, Modesto, Cal. "We find that our De Laval maintains the precision temperatures required in our production. The unique advantages of no leakage, low back pressure, and ease of cleaning are all in line with our tradition of quality."

DE LAVAL
plate heat exchangers

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.



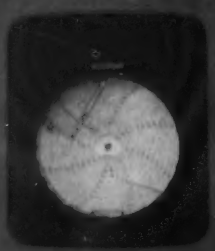
In DYNALOG Instruments, a simple, radio-type, variable capacitor replaces the troublesome slidewire — gives unmatched smoothness of balancing.

this
potentiometer
has
no slidewire

STEPLESS CAPACITY-BALANCING PROVIDES SPEED WITHOUT WEAR!

Friction-free balancing action! That's why Dynalog responds almost instantly to the slightest changes in a process variable . . . without wear . . . with *lasting* high accuracy.

The DYNALOG has no fast-moving parts . . . and no gears, cables, or complicated mechanisms to slow response. Sensitivity isn't limited by slidewire windings. A simple, variable capacitor and positive magnetic drive provide continuous, stepless balancing with a sensitivity of 1/100 of 1% . . . an accuracy of ¼ of 1%. And DYNALOG is never "off process" for standardizing — it requires *none*. There are no batteries to replace . . . no motors to periodically clean and lubricate. Only five moving parts!



DYNALOG's* EXCLUSIVE BALANCING ACTION

- no slidewire
- no batteries
- no standardizing
- no gears, cables, etc.
- no high-speed reversing motor

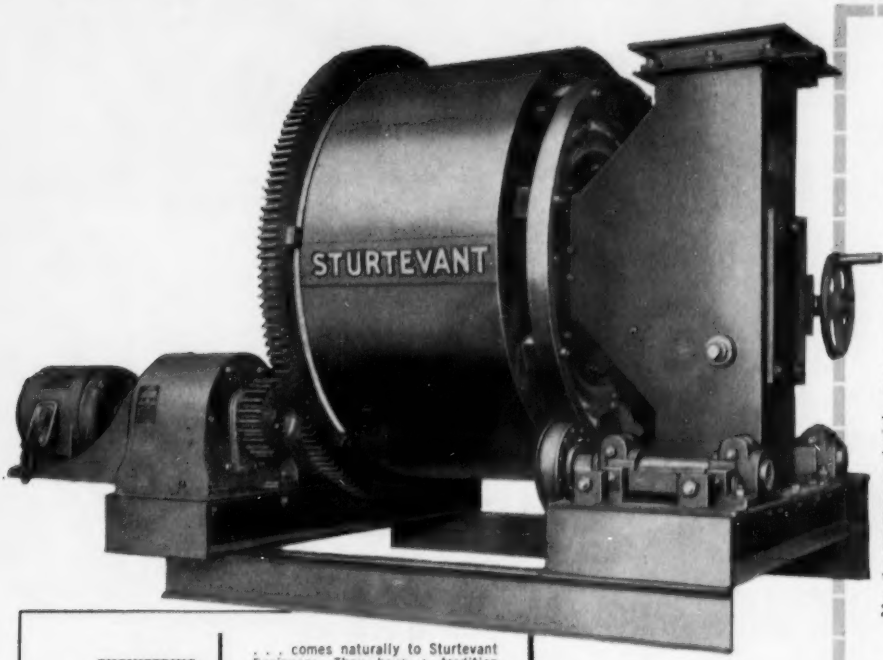
DYNALOG Instruments can be used with resistance, voltage, capacity, or inductive type primary elements to measure and/or control any process variable with unmatched speed and accuracy. Write for Bulletin 427. The Foxboro Company, 307 Neponset Ave., Foxboro, Mass., U.S.A.

*Reg. U.S. Pat. Off.

FOXBORO
*Reg. U.S. Pat. Off.

DYNALOG
ELECTRONIC INSTRUMENTS

COSTS OF BETTER BLENDS CUT TWO TESTED WAYS



ENGINEERING BLENDING AND OTHER DRY PROCESSES TO SPECIFICATIONS

. . . comes naturally to Sturtevant Engineers. They have a tradition of solving dry-processing problems since 1873. Sturtevant custom-built equipment and plants are well-known for their low-maintenance-cost operation. If your problems include any of the processes listed on the coupon, it will pay you to investigate.

Sturtevant Dry-Batch Blenders:

1. **SPEED UP PRODUCTION WITH 4-WAY MIXING**
2. **SHORTEN SHUT-DOWNS WITH "OPEN-DOOR" DESIGN**

Batches from 500 to 40,000 pounds come out of Sturtevant Dry-Batch Blenders exactly as you want them. They are completely blended regardless of the varying weights, densities or fineness of the different ingredients. And no dust is lost in the process. **Four different vertical and lateral mixing actions** inside the sealed rotating drum achieve thorough blending in minimum time. Single lever control of a single gate speeds up loading and discharging.

"Open-Door" accessibility makes cleaning and maintenance a matter of minutes. This original Sturtevant advantage plus 75-year-tested rugged construction assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are:_____

Desired capacity is:_____

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

STURTEVANT MILL COMPANY, 106 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Dry Blenders ☐

Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

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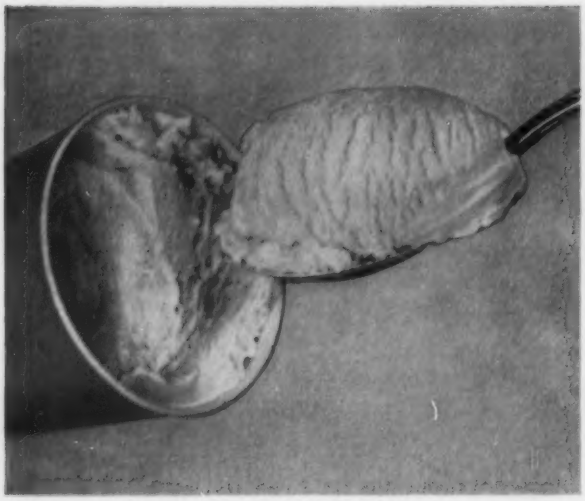

In the manufacture of ice cream the superior uniformity, purity and clarity of Globe and Rex® brand corn syrups aids the development of smooth, uniform textures which promote true flavors, assure quality ice cream.

Important factors in pie fillings are the natural sparkle, color and flavor of the fruit. Uniformly pure and clear, Rex or Globe® brand corn syrups retain these important characteristics, assure greater eye and taste appeal.

Maintain constant high product standards by utilizing the superior uniformity, clarity and sparkle of

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A COMPLETE RANGE, TAILORED TO MEET YOUR MOST EXACTING SPECIFICATIONS

As a "doctor" in confectionery making, Globe brand corn syrups are without peer in wholesomeness, clarity and efficiency. With a minimum of inverting power, Globe syrups promote better grain control, better deposit in the mogul, longer shelf life.

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Packaging for Dugan Brothers rolls by Continental Extrusion Corp., Brooklyn, N. Y.

Film of ALATHON® offers superior POLYETHYLENE RESIN transparency, impermeability and durability

Every day, more fine foodstuffs are being packaged in film of "Alathon" polyethylene resin. Du Pont "Alathon" combines superior protection with extra attractiveness . . . providing a package that is both durable and "eye-appealing."

These Dugan Brothers rolls, packaged in bags of "Alathon," keep perfectly even during the warmest summer months. In addition, their fresh, appetizing appearance is a constant visual stimulus to sales. Small wonder that sales increased when Dugan Brothers started packaging their rolls in "Alathon."

Film of "Alathon" is made from resin compounded by Du Pont to combine durability with an unusually high degree of transparency. For complete details on how you can use "Alathon" to make a better package for your product, mail coupon.

There is a difference in polyethylene resins — specify **ALATHON®** *for your packaging needs*

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offers Easier, Thorough Cleaning

Tygon B44-4 Milk Piping — the clear, flexible plastic tubing specifically designed to handle the processing of milk and milk products — can be cleaned quickly and easily with any of the standard conventional or proprietary cleaning agents. Not only is Tygon B44-4 resistant to the action of acid and alkaline cleaning compounds and detergents, but it is one of the relatively few thermoplastic materials which can be steam sterilized. And the glass-like clarity of Tygon permits visual inspection at all times.

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In ordering Tygon Tubing for handling the processing of milk and milk products be sure to ask for — be sure to get — Formulation B44-4. It is branded with name and formulation number for your protection.

TYGON B44-4 — the flexible, clear plastic tubing designed to handle pasteurized milk and milk products — is available in a range of sizes from [illegible]. Let us send you from our supply house of write direct to U. S. Stoneware, Plastics and Synthetics Division, Akron 9, Ohio.

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Nicholson *steam trap* quality *gives you* . . .

extra stamina for severest service

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson quality . . . throughout . . . means the extra strength, extra capacity, extra stamina that never let down. And, Nicholson quality pays off, when it comes to discharging condensate and air from food processing steam lines and equipment . . . most efficiently, dependably, economically.

- **powerful valve action—big husky bellows.**
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- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

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INTERIOR of one of the four Armorply storage rooms built for National Biscuit Company. This one, kept at a constant 60°F., is used to store waxed paper for trouble-free packaging. Other Nabisco Armorply rooms are a sponge room (78°F.), cool room (45°F.) and cold room (34°F.).

Now! A low-cost way to maintain temperatures from 100° above to 100° below

Armorply storage rooms are easy to erect or expand . . . require no maintenance

ARMORPLY ROOM is located inside National Biscuit Company building. But it could just as easily be built outside, or as an extension of existing building.

Got a storage problem? Have to maintain a temperature that's Arctic cold? . . . Summer hot? Or is your problem "where can I store a storage room"? Armorply solves all these problems *easily*.

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With their panel construction, Armorply storage rooms are a snap to put up, expand, or move with ordinary labor. You can install one in your building, out back, in your parking lot, or even on the roof.

Most important, the installed cost of an Armorply storage room is no more than ordinary plaster-and-insulation units.

Armorply itself is a waterproof plywood to which a metal face is permanently bonded on one or both sides. You can choose monel, stainless steel, copper, aluminum or any other metal. Armorply panels are light, waterproof, remarkably strong and easy to fabricate.

Send now for full information and a free sample of Armorply. Or see Armorply at any of our 87 offices in principal cities. In Canada: Weldwood Plywood, Ltd.

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Has your equipment lasted as long as

Firestone Steel Products Company, Akron, Ohio, leading producer of stainless steel beer barrels, has been a constant user of ENDURO Stainless Steel for the past 23 years. The company is also a major producer of stainless steel milk cans and syrup dispensing tanks.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

these Stainless Steel beer barrels?

Over 15 years of tough, hard service proves ENDURO-made equipment costs less to maintain

The manager of a leading brewery states, "These ENDURO Stainless Steel beer barrels have been in constant service for over 15 years and are still in what we term perfect condition."

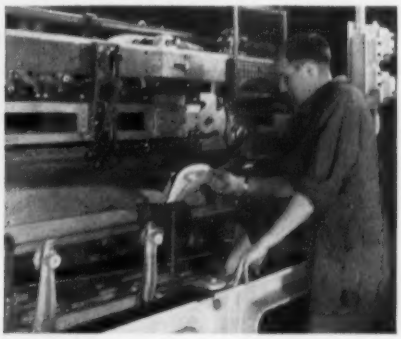
He goes on to say that the barrels have been subjected to plenty of abuse, yet have retained their strength and toughness. Maintenance has been held to a minimum. They come sparkling clean in a caustic soda solution. The need for messy pitch linings has been eliminated.

What about the food processing equipment you installed 15 years ago? Is it still in perfect condition? It probably is if it's made from stainless steel, and should last for many more years to come.

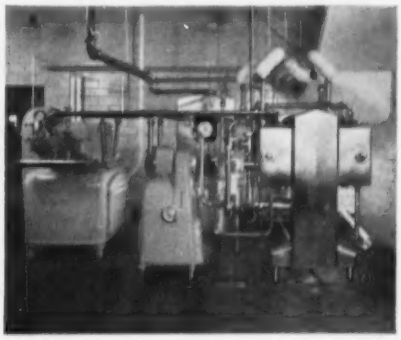
Long-range economies and other advantages of stainless steel equipment are not exclusive with the brewing industry. In the past few months we have given you numerous examples of how stainless has served the food, meat, dairy and beverage industries for over a quarter century. Examples of how it protects quality, purity and delicate flavor. How it saves time and money because it's so easy to clean and keep clean. How it minimizes down-time. How it withstands abuse and still maintains its strength, corrosion-resistance and sanitary appearance.

If you are planning to buy new equipment, it will pay you to specify ENDURO Stainless Steel. Your equipment supplier has all the facts. Or send the coupon for more information on ENDURO for food processing equipment.

REPUBLIC ELECTROLYTIC TIN PLATE is the ideal material for cans in which to send your product to market. It is made by the cold reduction process which provides all the qualities necessary for making tin containers on high-speed automatic machines. Republic also produces black plate for tin-free containers. Send coupon for more information.



REPUBLIC TITANIUM can mean tremendous savings to fish, meat and food packers using salt or brine. Titanium is practically immune to the corrosive effects of salt water. And is even more corrosion-resistant than stainless steel. Republic is constantly expanding production to meet your future needs. Republic metallurgists are working closely with equipment manufacturers on new developments utilizing all the advantages of this wonder metal. Write for more information.



REPUBLIC ELECTRUNITE STAINLESS STEEL TUBING AND PIPE hold corrosion in check. Your food, beverage and dairy products receive positive protection against discoloration and contamination. Corrosion-resistance and a wide range of resistance to temperature, pressure and physical damage mean that ELECTRUNITE® Stainless Steel Tubing and Pipe will last indefinitely. Bright annealed and polished O.D. and I.D. surfaces are available. The coupon will bring you more information.

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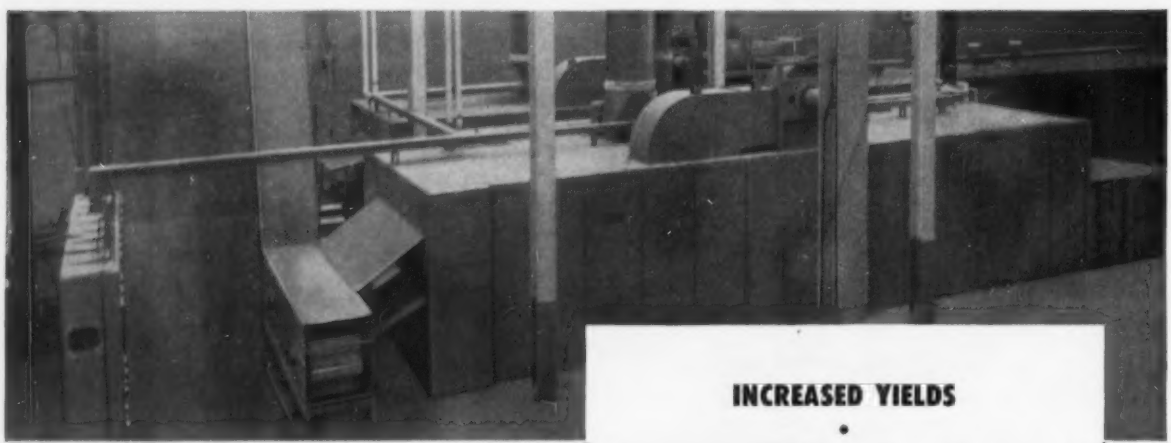

PRODUCT UNIFORMITY is of utmost importance to every food processor, at all stages of processing. The Proctor continuous conveyor dryer installation shown above is located in a plant of one of the world's largest food manufacturers—typical of many in use in the food industry today. In this plant Proctor Dryers assure uniformity of color, taste, and high customer appeal—yields are greatly increased!

WITH UNIFORMITY COMES PROFIT. Efficient drying per pound of product can often mean more direct profit than an increased sales volume. Proctor equipment provides the control, flexibility and construction features *essential* to profitable drying performance. Write or phone today for complete information.

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GUARANTEED QUALITY OF PRODUCT

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PROFITABLE OPERATION

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You operate 'smarter, not harder,' with a—

Work Simplification Program

¶ Wasteful actions are swept out . . . ¶ Productive routines sharpened . . . ¶ Costs cut . . . ¶ And employee morale boosted when a practical and thoroughgoing WSP is launched . . . The author demonstrates the 1-2-3 method—Appreciation, Education, Application—which has spelled success at the many Carnation plants

PAUL S. KVENMOEN

Work Simplification Coordinator, Carnation Co., Los Angeles, Calif. (With original sketches from the company WSP manual)

JUST IN the first two years it has been running, our work simplification program (WSP) at Carnation has paid handsome returns.

For it's already enabled us to discard a large number of unnecessary and obsolete procedures. And in addition it has helped us streamline numerous other jobs and methods.

Monetary savings from each change have ranged from several hundred dollars up to several thousand dollars annually.

3 Prime Requirements

In developing the program, three separate, major requirements were evolved. They are:

1. **Appreciation**—selling the program.
2. **Education**—training and practice.
3. **Application**—plan put to work and followed up.

No one of these phases is more important than the other. Each must be properly planned and executed in order to insure success. So let's discuss them one by one in detail.

1. Appreciation: First requirement for success of any company program is the sincere backing and participation of executives and all employees involved.

To get this backing the program must be worthwhile. It must be of benefit to the employees as well as to the company. We believe that a properly designed WSP answers these requirements.

To be successful, it is necessary to

Do's and Don'ts In "Selling" a Change to Personnel

ACHIEVEMENT
5. GET THE FACTS! BE ABLE TO ANSWER ALL QUESTIONS.
4. GET PARTICIPATION MAKE OTHERS A PART OF THE PLAN
3. PLAN THE PRESENTATION KNOW EXACTLY HOW YOU'RE GOING TO PRESENT THE IDEAS.
2. CLARIFY THE IDEA USE SKETCHES AND CHARTS.
1. ANTICIPATE REACTIONS LEARN THE MAN'S PAST REACTIONS - HIS PERSONAL GOALS - HIS ATTITUDES.
DO'S
DON'TS
DON'T CONFUSE THE ISSUE
DON'T FORGET PEOPLE ARE DIFFERENT
DON'T GET CAUGHT BETWEEN FORCES PUSHING IN OPPOSITE DIRECTIONS
DON'T APPLY PRESSURE. TAKE TIME FOR IDEAS TO SINK IN.
DON'T PUT THE CHANGE ON A PERSONAL BASIS - FORGET THE WORD "I"
WS

believe firmly in the inherent ability of every individual. As James F. Lincoln, head of Lincoln Electric, once said, "Great as American industry is, it leaves largely untapped its greatest resource—the productive power, initiative, and intelligence latent in every person."

And a good WSP is one of the tools necessary to tap this great reservoir of latent ability for the good of all.

Simple analysis will prove there are four reasons why such a program will succeed:

A. Employees like to participate in a worthwhile company program. It gives them a feeling of belonging. It boosts morale.

B. People just naturally try to improve. Given the incentive and the techniques, most will search out the easier and better way.

C. Most employees recognize the threat of economic competition and know that method improvements contribute toward security in their jobs.

D. It is natural for people to want the recognition and pride of doing something constructive and important.

Whiting Williams, human relations consultant, says "Pride satisfies two of our deepest, strongest, and most useful hankerings.

"Hankering No. 1 is for our own self respect. . . . That we, individually, have the right to believe that we represent a certain value in the scheme of things . . . that we are important, worthwhile, 'somebody.'

"Hankering No. 2 is the confirmation of our right to enjoy our self respect, which comes to us from outside sources in the form of recognition, esteem, honor."

Armed with these principles, the first step in the *Appreciation* phase is to sell the top man in the organization on the value of such a program.

If this is successful, the next objective is to get approval of the men in the top-level management group. This should be done in a 3-to-4-hr. "Appreciation Session" during which a synopsis of the program is presented. There should follow a discussion and formulation of company policy regarding the training.

Timing Is Important

About now it would be well to move ahead of the grapevine rumors and hold two more short appreciation sessions—one for all other supervisory people and the other for hourly employees.

Along with a short description of the program, be sure to emphasize here that *the aim of work simplification is to increase productivity—not by a speed up of the worker, but by eliminating the unnecessary parts of the jobs and processes.*

Explain carefully how productivity is tied to the wages we earn and to our standard of living. Statistics show that over the years an increase in productivity has always resulted in an increase in the standard of living.

The important fact is that if we, as a group, *produce a lot*, then we get a lot. If we *produce little*, we get little. Each of us gets a share of all that is produced by our company. It is like cutting a pie. If our share is $\frac{1}{4}$th, we would much prefer $\frac{1}{4}$th of a big pie to $\frac{1}{4}$th of a small one.

2. Education. Here the first question might well be, "What should we include in the training program?" This, of course, would depend to a great extent on the individual company.

There is no one WSP designed to fit every need. Although the fundamental principles, tools, and techniques are similar, they must be tailor-made to fit the needs of each situation.

In any event, this training should be set up to satisfy the two equally important aspects of any cost reduction program—the *technical* and the *human*.

The *technical problem* concerns itself with equipment and procedure changes necessary, along with weighing of the cost of the change against the estimated savings.

The *human problem* is brought about by the effect these technical changes have on the workers involved. Many cost reduction programs have failed in the past because only the technical aspects of the change were considered. Even more will fail in the future unless we give equal consideration to the human factors.

In the appreciation section we mentioned the four human factors which, by themselves, would guarantee the

success of any job improvement program. Unfortunately, there are also negative human factors which can throw up roadblocks in the path of progress.

The first of these is *Resentment of Criticism*. This is a trait of human nature we must not forget in proceeding with WSP. To change a person's work procedure can be construed by the worker as a form of criticism. He feels that you are not satisfied with the way he has been doing it. So before making a change, tell the employee of the need for the method improvement, and ask him for his ideas.

Many times the operator has already thought out a good, workable procedure change, but he never told you before because you never asked him for it.

Remember, the worker knows his own job best and should, therefore, be in the best position to simplify it. If for any reason this consultative approach is not possible, then by all means do a thorough job of "selling" the employee on the new change.

This is most effective when we—

A. Sell only when things are settled and routine.

B. Take plenty of time to make the explanation.

C. Give advance notice—that is, first just let them know the idea is in the works (rather than tossing it in like a bomb).

Workers Are Part of Plan

The second roadblock facing a methods-improvement program is *Resistance to Change*.

To resist change is as old as man. When someone is presented with a new idea, what is his first reaction? Yes, he very likely may reply, "It won't work," or "It can't be done," or "We've tried it before." This reaction is normal and always has been.

Think of the many products and inventions that people resisted when they first were put on the market.

When John Kay invented the textile industry's flying shuttle he was mobbed by weavers who felt the idea would eliminate their jobs.

The cast iron plow, invented by Charles Newbold, was turned down by the farmers, who said that iron would pollute the soil and encourage the growth of weeds.

Thomas Edison had to make his first installation of electric lights free of charge in order to get them a trial.

Only recently such items as canned beer, electric razors, zippers, and many more, were resisted when first put on the market.

Why do we resist changes so fiercely?

Mainly because changes attack a man's security, and security is one of the basic human needs. The worker knows all about the present way—he knows what to expect. He knows how much work there is, he has mastered the skills, he knows the value of those skills. He is "at home" with them.

Resistance to change is best overcome by letting the employee participate in planning the change. In this way he has a stake in the new idea—it's then partially his idea.

The 5-Step Plan

WSP can be defined as an "organized and systematic way of applying our natural common sense to job-and-method problems." The key words in this definition are *organized common sense*.

The really important thing that WSP adds is the organized approach to problems which most of us approach haphazardly. People aren't logical thinkers by nature. So it is necessary to train ourselves to think things out in a logical manner. To assure the proper action and sequence we employ a series of five specific steps for simplifying work.

This plan was adopted because it

How WSP Is Winning Benefits In Numerous Plants

QUICK ADVANTAGES have been chalked up by Carnation-Albers plants where the Servis Recorders have been installed. Fitted on bottle and cup fillers, bottle washers, etc., they show when stoppages occur, the charts enabling supervisors to track down and eliminate the causes.

► **Specifically, one of the company's fresh milk plants has increased efficiency of its ½-gal Pure-Pak operation to over 95% with the aid of this tool.**

SUPERVISORS at another of the fresh milk plants considered the possibility of abolishing the fold at the top of its weekly statements.

► **Final decision: Not only to do away with the fold, but also to revamp all statements, making weekly, semi-monthly, and monthly ones alike. Estimated saving: $2,500 annually.**

AT AN ALBERS feed mill, a flow chart showed that changing a scale-weight setting required 106 ft. of walking and 4-min. time.

► **But by relocating the scale-weight bar (cost $16), all travel and half the time were eliminated.**

IN MATERIALS HANDLING, gains have also been made.

► **Multiple-activity charts, prepared at one company evaporated milk plant, proved that a two-team 6-man operation could be combined into a one-team 4-man operation.**

AT ANOTHER of the fresh milk plants, it was indicated that widening of the rear doors of the relay truck permitted skids to be moved directly into the body, eliminating the double handling previously required when using rollers.

► **Result: A direct saving of 50% in labor.**

THE PROGRAM brought installation of two sections of conveyor and two curves at another evaporated milk plant.

► **Cases are now loaded directly from second floor storage to truck without transferring to skids.**

TWO STAINLESS-STEEL SPRINGS were attached to sides of guides on the output end of the accumulating table of the bottle washer at one of the fresh milk plants.

► **These springs now stabilize and prevent upsetting of ½-pt. bottles, and in a 10-day test, a daily decrease of 47 lb. in broken glass was recorded.**

INSTALLATION of a panel in its laboratory to aid in tagging sample bottles was a further move at another Albers mill.

► **This now saves about 1-min. time and 202 ft. of walking for each of 60 samples (average) per day.**

A SPECIAL triangular section was added to the corner of the L-shaped loading dock at an evaporated plant.

► **This has eliminated complicating maneuvering by lift-trucks when loading and unloading trailers.**

has been proved over the years by many companies to produce better and more consistent results than any other approach. Here is the plan—

Step 1. Pick a job to improve. The things that need improving most are not always apparent. Because we are used to given situations, it is easy to walk by them day after day without "seeing" them.

So make it a point to look for jobs that are causing trouble—high cost jobs, bottlenecks, tasks where lots of people are involved, operations that require chasing around for materials and supplies.

Step 2. Visualize the problem. Get the facts. Make a process chart. In order to analyze a complete process, all actions that comprise it must be written down detail by detail in the order in which they happen. Once you have this visual word picture of the problem you are in a better position to solve it. (The charting will be described following our listing of the five steps.)

Step 3. Analyze and Criticize the present method. Using the process chart prepared in Step 2, you can now sit down and question each detail of the process.

Many years ago, Kipling wrote: "I keep six honest serving men (they taught me all I knew); their names are *Why*, and *What*, and *When*, and *Where*, and *How*, and *Who*."

These six questions will help to determine the necessity of each detail. Accordingly, do not leave any detail until satisfactory answers are obtained in this pointed querying routine:

What is done? *Why* is it done at all?

Where is it done? *Why* is it done there?

When is it done? *Why* is it done then?

Who does it? *Why* does this person do it?

How is it done? *Why* is it done this way?

This intense analysis will bring to light useless and unnecessary actions in the procedure—actions that can be eliminated. The questioning also generates many good ideas for use in the next step.

Step 4. Develop an improved method. Using the ideas developed in the previous step, along with the remaining necessary details, you are now ready to work out the better way. Is there any possibility of—

a. Eliminating unnecessary steps?
b. Combining operations?
c. Changing sequence of details?
d. Changing the place?
e. Changing the person?

In developing the new method, don't overlook the ideas and suggestions of the man on the job and the department supervisors. You will find that they are among the best sources of help for working out ways to simplify work.

When you have a particular idea developed the way you want it, then evaluate the results. Is the solution practical? Does it require further study?

Don't forget to consider the costs involved. Will the proposed change actually increase productivity and reduce costs? Will it make the job easier and safer?

Step 5. Install the new method. When you have gone through the first four steps, and are convinced of the value of the improvement, then recommend its adoption.

Charting the Course

Note that Step 2 (above) called for you to visualize the problem, and make a chart of it. But what *is* a process chart?

There are, as a matter of fact, three types. They are used to give us a simple word picture of exactly what is done in a particular job or process. These are the principle tools of WSP. Each has its own use in job study:

a. *A Flow Process Chart* is used to follow a man or material through an entire process, particularly when distance traveled is the primary factor.

b. *A Multiple-Activity Process Chart* is used to plot the activity of men and/or machines when time is the most important factor.

c. *An Operation Process Chart* is employed to record motions of the left and right hands of the operators.

Flow Chart Most Useful

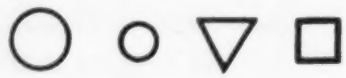
Of the three, the flow chart will probably be used the most, so let's discuss it first. Here are seven points to follow in its preparation:

1. State the job being studied, and revise it until you are sure you are really breaking down the intended job. Pick a starting and ending point to be certain to cover the exact ground, but no more.

2. Pick the subject to follow. Select a person or material, depending on which goes through the entire process. Then stick with this subject and record every detail that happens to it.

3. Write a brief description of each detail. Everything that occurs to the subject must be recorded on the chart, step by step, no matter how short or temporary. To make sure you catch each detail, make the chart on the job as you see it being done.

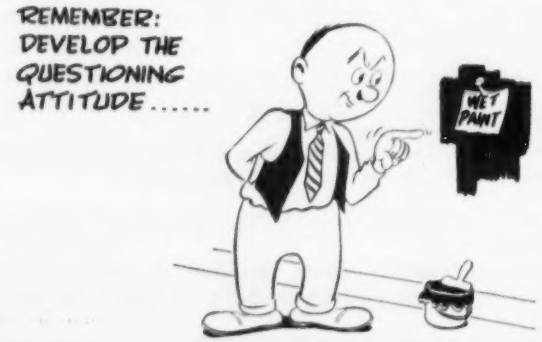
4. Determine and connect the symbols. Description of the detail determines which one of the following symbols to employ:



A. Operation (large circle)—When something is being changed, created, or added to, as typing a letter, opening a case, filling a can, initiating an invoice.

B. Transportation (small circle)—When something is moved from one place to another, as a box moved by hand-truck, carton moving on a conveyor, walking to tool room.

Apply the Organized Approach to all Problems



C. Storage or Delay (triangle)— When the subject is kept in a warehouse, or when it is interrupted or delayed in its flow through the process, as carton waiting for truck, goods in warehouse, man waiting for elevator.

D. Inspection (square) — When something is checked or verified but not changed, as checking a requisition, testing weight of finished product.

Now draw a connecting line between the sequential series of symbols you have chosen to represent the activity (see illustration at right).

5. *Block in "Do" operations (blacken the circles).* All work is made up of three parts: "Make-ready" (getting machinery and materials ready to do the job; "Do" (the actual work done; that which adds value to the product); and "Put away" (the clean-up following the "Do").

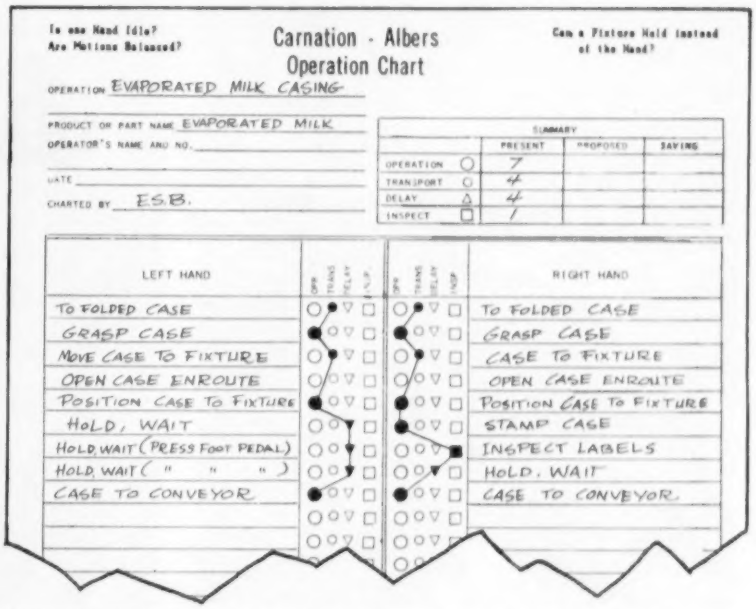
6. *Enter distances* in feet every time you have a transportation. Add time if required.

7. *Make Summary.* Add up all details and put them in the summary block. This should show total number of operations, transportations, storages, and inspections.

The flow process chart tells the complete story of the subject being followed, from the very beginning of the process to the end. But it should be supplemented with a flow diagram. This is simply a layout of that part of the plant where the action is taking place.

Here, the flow is indicated by a line tracing the movement of the person or thing being charted.

This Step 2 charting is valuable because it breaks down the process into its simple individual details.



OPERATION CHARTS are used to study a single operator working in one place on a repetitive job. Actions of each hand are classified into four categories: Operations, transports, delays, and inspections (represented on chart by appropriate symbols). Then symbols are joined by lines.

Multiple-Activity Chart

The second tool of measurement is the Multiple-Activity Chart. This is sometimes called a "man and machine" chart (see right). It's used to plot an operator and a machine working together on some type of job. Another use would be where we have two or more people working together as a team.

We all know how important it is to keep both operator and machine working at maximum capacity, because both will cost about as much per hour standing idle as they will in operation. The first stage in eliminating this unnecessary waiting time is to make an activity chart which shows exactly when each works and what each does.

To make this chart:

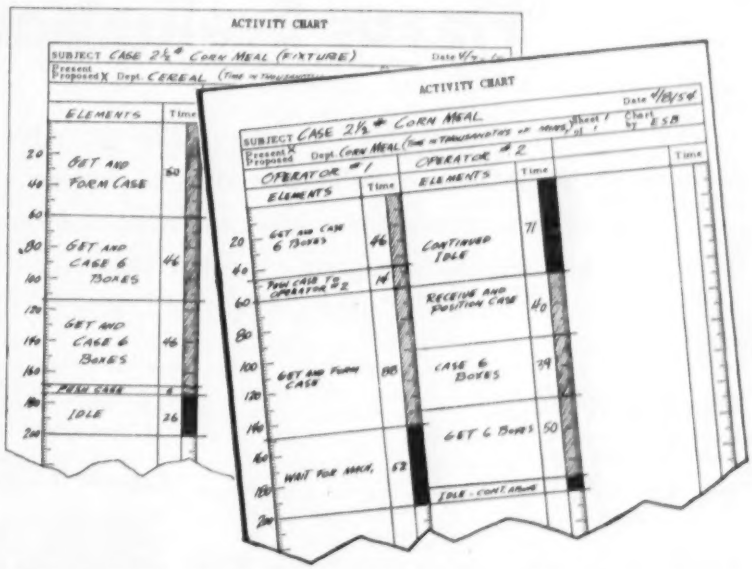
1. *Decide on the breakdown of work elements* that you want to measure for each operator. These may be either a course or fine grouping of details, depending on what you want to show and, also, on how accurately you can time the element.

2. *Pick a starting point in the work cycle,* a point where you can identify exactly what each man or machine is doing at that instant.

3. *Measure the time required* for each work element.

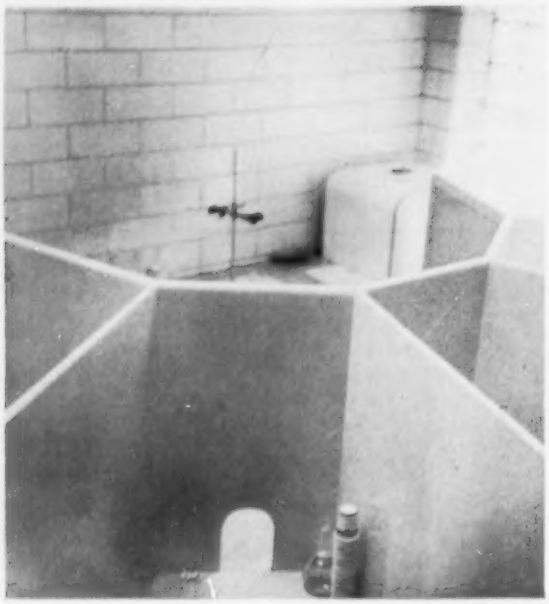
4. *Plot the results* on the activity chart. Try to choose a scale which will keep the work cycle on one sheet. Be sure to key the activities of the

(Turn to page 146)



HOW ACTIVITY CHARTS operate. When corn meal casing procedure at Oakland plant was studied (right chart) it showed that, with two operators, one was idle a large part of the time. When a fixture was installed to help open cases, one operator could easily do the job (left chart), thus effecting a 50% reduction in direct labor cost, and a less fatiguing procedure.

A proper lab helps ↓



. . . But that's not enough

Sound procedure helps ↓

. . . But that's not enough

"Flavor Evaluation Still Has a

—So declares this researcher. And he follows through with a straight-from-the-shoulder critique, urging sharp reappraisals of present time-and-money-consuming programs—many of which he contends are poorly conceived and executed. Finally, he proposes three key steps for putting this science on the right road

JOHN W. MITCHELL

Director of Flavor Research, G. Heileman Brewing Co., La Crosse, Wis.

TODAY, after an initial decade or two, the field of flavor evaluation finds itself in much the same position as did other sciences during their formative years.

▶ **This is the serious fact: There is urgent need for careful organization to lift flavor evaluation out of the existing chaos.**

True, this has been attempted. But the efforts thus far haven't been enough. Even a cursory examination reveals woeful shortcomings.

Yet thanks are due—in part, at least, to a fortuitous start—for the fact that some real progress has been made since the time of the "single expert" and since the days of general disregard for what the consumer wanted.

Yes, many progressive food companies now have their own flavor laboratories, and others make use of commercial facilities that consult on problems involving flavor. This indicates that more companies are truly concerned about the reactions of the purchasers to their products. And because of this, more products have been acquiring uniform appeal today than ever before.

Consumer Reactions Are Dominant

▶ **However, along with the successes have come several failures. Most of these have been caused by well-intentioned individuals who did not have adequate or proper knowledge, and who, with their naive and overfly simplified approach, were unable to resolve their flavor problems successfully.**

At the same time, some of the failures must be directly ascribed to the inadequacy of existing methods, especially those dealing with the primary problem of flavor evaluation —consumer reactions.

▶ **The influence of consumer reaction—now dominant in many areas where only convenience or economy served as criteria in the past—is possibly the most striking accomplishment of flavor evaluation to date.**

And yet, despite great interest in the consumer, and despite the development of comparatively refined techniques, such as the forced purchase test and various motiva-

The well-trained tester helps ↓

. . . But that's not enough

Long Way to Go"

tional methods, there is considerably less valid evidence for accepting consumer reaction results than there is in such other areas as uniformity testing.

Oversimplification must be avoided in an appraisal of consumer acceptance. For it is, in fact, the most complex and, at the same time, the most vital problem presently facing the food manufacturer.

► As the pollsters have discovered to their dismay, there is, and always has been, a finite difference between what people say and what they *do*.

A multitude of motivational pressures are at work on a consumer when he makes a choice of brands in a buying situation. Likewise, there are many pressures in the testing situation.

Unfortunately, these pressures are not the same for the two areas of choice, and prediction from one situation to the other is hazardous.

Some supposedly enlightened people insist that a panel of 4 to 6 experts can, through their specially endowed senses, do a good job of prognosticating. Under this circumstance, we are fortunate that more mistakes have not been made.

Importance of Flavor

In a food or beverage, flavor should, it would seem, be the most important factor in acceptance or rejection of the product by the consumer.

But how do we measure acceptance? The current approaches and techniques range from the carefully controlled laboratory test to the almost completely uncontrolled home-use test.

The opportunity for error in each method is definitely too large. True, the laboratory has precise control of preparation and serving conditions—i.e., temperature, sample quantity, appearance, order of presentation, etc. Also, control of the judgmental situation is good, and reliability generally is reasonably high. In the matter of validity, however, there still are many unanswered questions, such as—

. . . Does the expressed preference of this limited panel match that which would be found if all consumers were tested?

. . . Does the test sample size, serving temperature, and the like, give the same answer as would be found with normal consumption?

. . . When 52% of 500 subjects pick one of a pair of samples does it mean that 52% of the subjects truly prefer one sample and 48% prefer the other?

. . . Or does it mean that they could not detect a difference, and so their responses were randomly distributed?

. . . Or could it mean that 96% of the subjects did not detect a difference, and their responses were evenly split, while the remaining 4% found a difference and unanimously preferred one sample?

. . . And, even if the 52% represents a true preference does it mean that 52% will buy the product?

As for the home use study, there are not only these problems, but also all of the plaguing biases and errors that can enter through the uncontrolled environment.

Inherent Difficulties

In the laboratory or the home, the very fact that a test is being conducted presents difficulties. For example, in a test situation there usually is strong evidence that the subject is motivated to respond as he thinks he "ought to." This may not reveal his true preference, or what he would do in a buying situation.

It is possible, also, that the flavor of a product in a single sample is not the same as it is in normal consumption where impressions may be built up over repeated tastes and long periods of time.

Another difficulty in a product test is that the approach most generally used is "atomistic," with experimentally extraneous stimuli (such as color, appearance, package, advertising, and the like) eliminated or controlled so that flavor can be measured.

This, in itself, is not wrong. But much too often, a single result, such as a flavor measurement, is used as the sole basis for predicting consumer acceptance—*and this is wrong.*

For instance, color stimulation of the eye may have a very direct effect on what is reported as a flavor sensation.

Would a piece of green beef steak *taste* as good as an equally palatable normally colored piece?

Or would you be safe in predicting that the green steak, equally preferred on a flavor test where color was masked, would have equal consumer acceptance?

Investigators have found that white butter *tastes* like margarine and that yellow margarine *tastes* more butter-like than white margarine, even though the respective samples may be identical in flavor.

Overlapping Sensations

These are extreme examples of sensation transference, it is true. But it seems quite probable that all food products are judged in an aura of overlapping sensations. And the unfortunate part of the problem is that such transference is not entirely rational, is usually hard to predict, and is always personal.

Furthermore, the consumer generally isn't conscious of its occurrence. Or if he is, he will attempt to hide its existence by rationalizing his response.

From this it can be seen that the atomistic approach, even if it includes the isolated measurement of all factors, will not always give the correct answer.

On the other hand, measurement without the control of all but the experimental variables leads to hopeless confusion in the interpretation of results.

▶ The answer seems to lie in the use of the scientific method combined, with a proper regard for, and cognizance of, the psychology of human behavior.

This is necessary not only in consumer studies but also in control and research testing.

The panel director who trains his subjects not to look directly at the samples during a taste-difference test, and who, therefore, is not too concerned with color differences, is actually ignorant of basic psychological facts about motivation and behavior, so his results will not be valid.

And the man who presumes to predict consumer acceptance on the basis of an "overall theory of what the public wants" is almost certain to make serious errors.

Another failing of many laboratories has been in placing too much emphasis on statistical interpretation. For this technique does not automatically make a test or experiment valid.

▶ If the test is based on unsound psychological principles, or if basic controls are absent, no amount of statistical interpretation will achieve validity or "scientific status."

In such a case, the statistical statements of significance and reliability will be completely misleading rather than helpful.

The widespread use of statistics has also led to a general discrediting of any data that cannot be reduced to numbers.

Certainly there are many times when it is advantageous to sort the customers into various categories and to enumerate them.

No Superior Test Method

And there are other cases when subject responses can be assigned quantitative values. Here, the use of statistics in analysis is to be desired and makes results more meaningful.

This does not mean, however, that all data other than numerical data are worthless. For example, it has been suggested that telling the subject whether he is right or wrong, after each taste-difference test, does not help him to learn the discrimination.

Careful introspection, however, indicates that, in some comparisons, knowledge of an error will definitely help in correcting the error on succeeding tests.

The complaint is raised that introspective data are subjective and therefore less reliable than other results. Such a complaint is ridiculous. All measurement of qualitative reaction to sensory stimuli is based on subjective impressions, and the transformation of these impressions to numbers does not, in itself, give them objectivity.

For some time there has been much speculation—but little worthwhile evidence—as to the superiority of the triangle, the duo-trio, or the two-sample method for taste-difference testing.

Nothing could be more pointless. Each method, in its proper use, is psychologically sound, and each probably has specific applications in which it will give superior results.

Furthermore, an experiment to establish one method's superiority over the others is worthless, except in the exact context of that experiment.

Much more to the point, therefore, is continuing study of ways and means of increasing the reliability of each of the methods.

A similar statement can be made concerning consumer acceptance studies. Which is better—a single stimulus or a paired test? And which has more validity—a laboratory or a home-use test?

Neither test is any better than its psychological foundation and, as in the taste difference tests, greater ultimate progress will derive from an effort to improve sensitivity, reliability, and validity, rather than from efforts to prove one method's superiority.

Is the situation hopeless? Not at all. There is confusion in the field today—a confusion of heterogenous terminology, of a multiplicity of unstandardized procedures, of inappropriate and sometimes inadequate tests, of blind use of statistics, of a tendency to give broad application to specialized findings, of a lack of decent experimental design in many cases, and of a complete lack of regard for flavor in others.

Concerted Action Required

Nevertheless, the evaluation of food in terms of flavor uniformity and acceptance can be accomplished reasonably well. Granted, there are some areas that need extensive research.

But development will come when the tests now being conducted are put on a solid basis so that the success of some methods will bring the weak ones into clear focus. Unfortunately, this is not being done.

▶ In recent years, food technology has made rapid strides due primarily to the chemist and the engineer. Their contribution has been highly significant.

But, in general, they do not know, and are not trained to know, how to conduct experiments involving human reactions. Yet in too many cases it is these people—as unqualified as they are—who are being assigned, or are voluntarily taking on, the duties of originating and conducting a program of flavor evaluation.

(Turn to page 139)

Tough Problems Started It

The birth of scientific flavor evaluation traces back to the late '30s, when a few companies began searching for more precise methods for attacking flavor problems.

One of the first to attempt an organized approach was Joseph E. Seagram & Sons who, in 1938, hired Dr. E. H. Scofield, an experimental psychologist from Ohio State University. For Seagrams had real problems—

. . . Lack of product uniformity, with no adequate methods for its measurement.

. . . Unsatisfactory, or non-existent, means for evaluating research results for improving products.

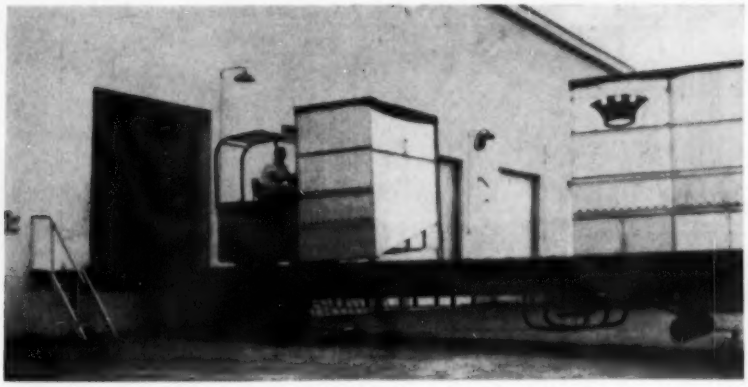
. . . Actual return of goods from dissatisfied customers.

. . . Further, this blended-whiskey producer was fighting a market dominated by straight whiskeys.

Dr. Scofield "got right to it." He developed and modified a variety of psychological tests with which to assail these problems. In consumer-acceptance work, he used paired comparison and ranking and rating tests. And he made the duo-trio test the foundation of a uniformity-control program.

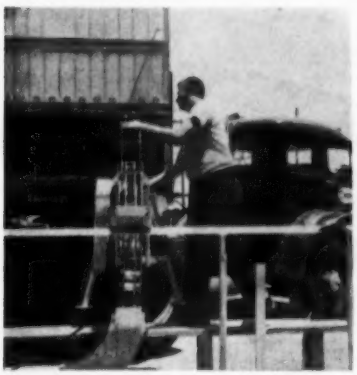
This was the first such use of psychometrics. And it was eminently successful, being based upon sound principles derived from experimental psychology.—*J. W. M.*

AT CAN PLANT →

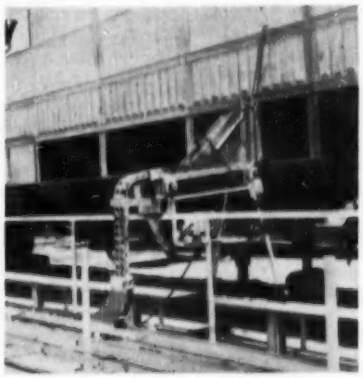


FILLED containers go on flat-bed trailer. Note sloping bottom that makes each container self-unloading.

AT CANNERY →



PLATFORM MAN aligns wheeled boot with cell in container, removes locking pin, and . . .



. . . **CANS DISCHARGE** (open ends up) to cableway that feeds them to filling line.

New Maker-to-User System Feeds in Cans at 2,000/Min.

Flowing from multi-cell shippers, cans "cable" directly to filling lines . . . Method's advantages demonstrated at several Florida citrus concentrate plants

AN INGENIOUS high-performance can-delivery system now directly links the can maker's production lines to the cannery's filling lines. It incorporates a fast over-the-highway service.

To the canner, this development (by Crown Cork & Seal Co.) represents a major advance in can-handling economy. For the system is extremely easy to install, requires no unscrambler to feed cans to the filling lines, and needs only one man on the receiving platform.

In recent demonstrations at Minute Maid plants in Leesburg and Bartow, Fla., deliveries of more than 2½ million 6-oz. cans were unloaded at speeds exceeding 2,000 per min.

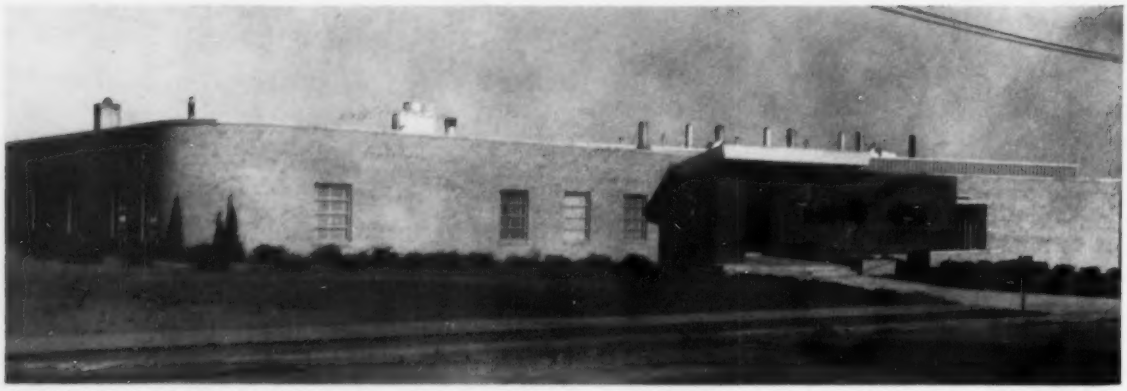
However, company engineers feel that the system's delivery speed is only limited by the rates of the cannery's filling line.

The new system utilizes conventional flat-bed trailers on which are loaded specially built containers (eight to a trailer).

Each of the containers is fitted with eleven vertical cells and is made with a pitched bottom which is self-discharging when the cell-gate locking pin is removed.

Cans are fed into the cells at the Crown plant so that they lie horizontally in an organized pattern, open ends all facing in the same direction. Cells are specially constructed to guard against scratching of lithography on the cans and to prevent denting of flanges in transit.

At the canning plant, cans discharge by gravity from the containers. They go into a wheeled boot mounted on a track (see photos). The boot then discharges them, in an orderly, ready-to-fill pattern, directly to cannery filling lines via a cableway extension that parallels the boot track.



CLEAN-CUT MODERN DESIGN distinguishes the Kitty Clover potato-chip plant. Its smooth functional lines and attractive facade meld with the landscaping to give a simple 1-story appearance from the street. But actually the structure is built into the side of a hill, which hides its lower-level that serves for storing, curing, washing, and peeling. Slicing, frying, and packaging is carried out on the main floor, which also houses the offices.

Quality *and* Efficiency In Unimpeded Production

Omaha potato chipper maintains constant peak Q.C. even though operations have been highly accelerated on his non-stop lines

FE STAFF

Finest-quality product has continued to be the order of the day at the modern-engineered Kitty Clover potato chip plant in Omaha, Neb.—despite the many production revisions introduced over the last two decades to clinch top efficiency.

• **"During that period," say company executives, "we've changed just about everything on the line to meet demand by running up our potato flow to 4,000 bu. daily—or nearly a quarter-million pounds of chips. But our long-established high quality hasn't been included in these changes."**

Immediately on receipt, the carloads of potatoes are checked for specific gravity, which is recorded. This way the production department knows directly whether the potatoes may go right to processing lines or first await "curing."

This inspection is made by immersing a basket-load of 8 lb. of spuds in water, then taking the sp. gr. reading off a spindle. If the figure is below 1.085, the potatoes go into one of the huge curing rooms, where they are periodically checked until ready for processing (at sp. gr. of 1.085-1.100).

And quality care is also exercised in another way: Before a full carload lot goes to production, the 8-lb. test sample is run through on the line to check for color uniformity.

• **Identifying Trick:** The way they distinguish test-lot chips is to first plug out a hole in the center of each of these potatoes. Then the test samples are the doughnut-like chips picked up as they come out of the fryer.

• **Q.C. Curing, Too:** Nine specially designed storage rooms were constructed to cure the potatoes until they are just right—a process sometimes requiring as long as a month. Each room holds three carloads and is maintained in the 60 to 65-F. range by steam-heated blower-type units.

Further, there is located in the lower-level area—where washing, peeling, and box-making is set up—a temperature-and-humidity controlled room for proper storage of waxed paper bags.

This particular room is kept at 68 F. (with wet and dry bulbs at 60 and 68 F.) to prevent bags from becoming brittle and tearing at the packaging department's bagging station.

Care Accented in Processing

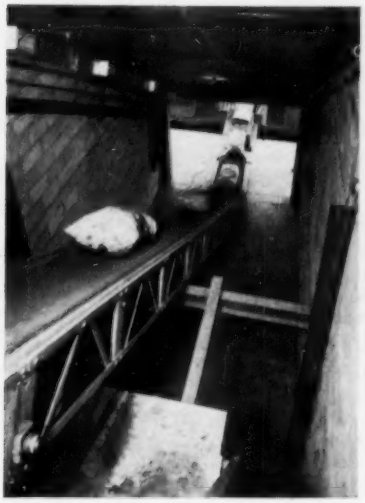
Now to the major, exacting control in the chip operation itself:

The washed and peeled spuds proceed through four continuous slicing-frying lines, each producing some 6,000 lb. of chips hourly. And following the slicing stage, there is greatest care to wash surface starch and potato slivers from the slices—which are also treated to remove sugars and amino acids.

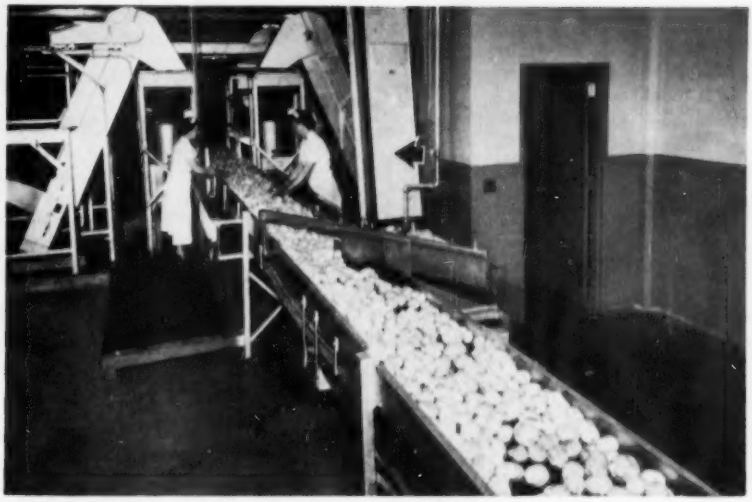
Next, in the non-stop fryers, incoming circulating cooking oil is heated to 325 F. and finishing oil is dropped to about 300 F. The cooking oil is pumped directly to these fryers. Time of frying approximates 3½ min., and total time of processing—from raw potato to packaged chips—is about 30 min.

The finished chips coming from the fryers are drained of excess oil as they pass through a rotary, brush-type salting machine. And they then get thorough inspections for quality before

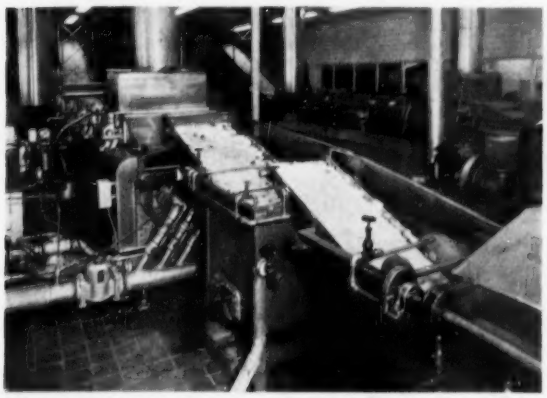
Revealing Closeups—Raw to Finished



BAGS WHISK on conveyors from RR cars to storage, curing. A 100-ft. belt (not seen) feeds in from other cars.



FROM 2 PEELER UNITS (background), spuds drop on conveyor for inspection and "eye-ing" prior to being bucket-elevated—at different points along belt (one indicated by arrow)—to slicers and fryers.



ON FOUR LINES (two seen here), potatoes are sliced. Cleansing of slices follows, then they're fried and salted.

EFFICIENT, SPIC-AND-SPAN packaging lines bag the freshly fried chips. The bags are sealed, packed in cases.

the overhead conveyors move them on into the packaging room.

Engineered Efficiency

High engineered-efficiency of Kitty Clover's production is clearly reflected by these many quality operations. In truth, this efficiency is stressed throughout.

Trail-blazing feature is the special straight-through flow of production, marked by segregation of specific operations in separate rooms. Set apart are the washing and peeling, slicing and frying, and packaging stages.

Arriving in carload lots (500 bu. per car), the bags of potatoes travel from the cars via portable telescoping-type conveyors. They are thus delivered to a 100-ft. conveyor extending along the receiving dock.

From the dock bags are lifted by a 30-ft. inclined rubber belt to the area solely used for storing and curing potatoes.

The potato warehouse holds fully 60 carloads. Here, bags are loaded 24-to-26 on pallets, which are then stacked two-high by propane-operated fork-lift trucks.

Jumping now to processing: Operation of the fryers is pushbutton-controlled from panel boards, which are also equipped with temperature gages. Start-stop buttons are for rake speed, main cooking oil pump, conveyor for washing units, and auxiliary pump for cooking oil.

Then, in the modern packaging room there are automatic stainless-steel bagging machines. Check-weigh filling proceeds on 10¢ bags (1¼ oz.) at speeds up to 100 a min. Another three units package 25¢ bags at 75/min., while two others fill 35-40 bags/min. on the larger sizes (39¢ and 69¢ items).

On two lines, shipping cases are set up and delivered, by an inclined rubber-belt conveyor, to this main-floor packaging department. The shipping cases are re-used — returned knocked-down by sales drivers coming back from the retail outlets.

• **Streamlined movement:** Still another efficiency point relates to the conveyors of the plant. Flow on them is not curbed. For any jam-ups of items is remedied by action of in-line micro-switches that automatically cause relieving "start ups" when clustering breaks the switch contact.

Containers of chips are finally packed into the shipping cases and moved to the dock to go out. These cases are sent unsealed so that the company can get extra re-use from them.

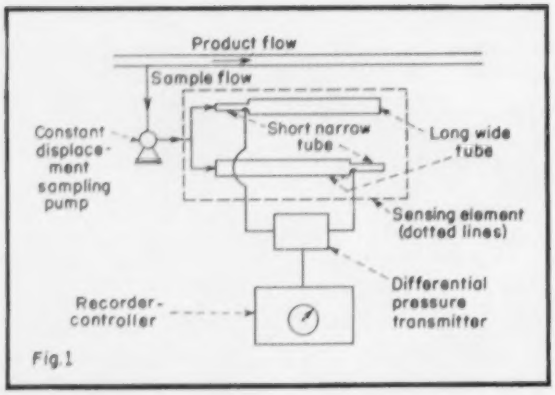


Fig. 1

TYPIFYING THE ADVANCED UNITS discussed at St. Louis is this continuous consistometer. Design is based on a differential shear-rate principle. Unit measures variations of flow resistance in tubes having two different diameters and lengths.

IFT'ers at St. Louis Annual Hear—

Latest Food-Research Facts On Automation and Additives

Lively engineering session points up role of the newest automatic process control instruments, also advanced machines to test, sterilize, blend, and freeze-clean food. Panel men emphasize need to keep on top of controversial action in food additives.

FE STAFF

HIGHLIGHTS of the IFT session devoted to food engineering were plant-practical pointers on operation of (1) a new continuous consistometer, (2) an automatic liquid-solid blender, (3) latest process and test instruments and (4) how to use straight thinking in applying them, (5) direct steam injection for HTST sterilization of canned corn, (6) continuous steam injection of tomato juice, (7) paramagnetic resonance, and (8) a unique freeze method for cleaning foods.

Further, the technologists gathered at St. Louis heard startling experimental evidence of how fresh food flavors can be restored even to dehydrated vegetables by simple addition of enzyme preparations.

Probing deeper into the role of food additives, a special panel discussion thrashed out basic IFT policy on this controversial subject.

Here are the hard-core facts from the engineering session, chairmaned by I. J. Hutchings, H. J. Heinz Co.:

1. Continuous Consistometer

A new continuous consistometer—the Plastometer—designed to indicate, record, and control consistency of food purees during production was topic of a paper by Dave Eoklin, Gerber Products Co., Oakland, Calif.

Measurements from this new unit are directly related to slope of a viscosity-shear rate curve. And there's excellent correlation between figures obtained with this unit and conventional Adams or Bostwick hand-type consistometer readings.

Design of the Plastometer (Fig. 1) is based on a differential shear-rate principle. Instrument measures difference in flow resistances, at two different rates, of puree flow through a sensing element consisting of tubes of two diameters (one short and narrow, the other long and wide).

Difference in resultant hydraulic pressures is calculated by a differential pressure transmitter. And this variation is relayed to a pressure-activated recorder or controller.

No moving parts come in contact with product, except in the sampling pump. And unit is insensitive to minor changes in flow rate brought about by slippage and pump wear.

2. Non-stop Blending

Operation of an automatic machine for continuous mixing of solids and liquids to exact consistency was covered in a paper by R. A. Minard, Brookfield Engineering Laboratories, Inc., Stoughton, Mass. It was specifically directed to Machine's application in breading frozen seafood products:

Battering and breading of fish sticks are critical operations, declared Mr. Minard, since they influence final size of products, proper fitting into packages, net weight, uniformity of breading (elimination of "bald" spots), and product color.

The new method of controlling batter preparation in-

volves use of a Fitzpatrick Homoloid, Brookfield Viscometron, Foxboro Dynalog, level control, and automatic panel. (For point-by-point operation, see p. 66 in this issue).

3. Advanced Instrumentation

▶ **Pictorial Instrument Panels:** Present trend toward continuous production in the food industry demands a reappraisal of instrumentation, stated L. M. Richardson, Foxboro Co., Foxboro, Mass.

Problem is no longer whether instruments are really needed—but on how to attain maximum benefits from the investment.

The speaker said that the solution—whether continuous or semi-continuous processes are desired—is in use of graphic panels, containing pictorial instrumentation.

These control centers consist of enlarged diagrams of process flow. Included are only those flow lines and equipment directly involved in the process-control system. Indicators are mounted on these diagrams and shown in correct location with respect to process.

To make the diagram simple to follow, flow lines and instrument connections are color-coded. Indicators are pneumatic receivers, each collecting a 3- to 15-psi. air signal that is proportional to the variable measured by its transmitter. Receiver can also record process variable. And a controller, behind panel or directly-mounted at process, can be added to the pneumatic circuit to maintain measurement at a pre-set value.

A typical receiver-recorder-controller has a dual scale with pointers. Upper half of scale shows air-pressure range. Lower half reads 0 to 100, corresponding to chart range. Here, a pointer controls measurement.

Beneath set pointer, a pen records the variable on a chart. And below the instrument a lever-operated slide valve allows switching of controller from automatic to manual.

Graphic lines are painted red for steam and green for product flow, Mr. Richardson continued. Instruments are applied to give a continuous view of what's happening in the process—like tank pressures, product levels and flows, and temperatures.

Prime advantage is that the indicators on the panel familiarly depict process action to the operator.

For product level, a ribbon moves up or down scale in response to signal. Measurement is readily seen at dividing line between white (upper) and colored (lower) portions of ribbon. This way, operator can "see" at a glance product level in the tank.

A flow indicator comprises a single-ribbon indicator placed horizontally in flow line. Green portion of ribbon moves to right as product flow increases; to left when it decreases.

For valves, a vertical dual-pressure indicator depicts operating condition. When pointer is to the left, it indicates valve is on automatic control. And when it's to the right, valve is on manual operation.

▶ **New Control Devices:** Latest instruments for control of different process variables were pointed up by William J. Scarlett, Minneapolis-Honeywell Regulator Co., Brown Instrument Div., Philadelphia. These present a challenge to the food technologist, process engineer, and control engineer for adoption to specific problems in the industry.

Some variables, which only a few years ago required laborious laboratory methods, are now measured with pH electrodes, conductivity cells, strain gages, nuclear radiation, flow colorimetry, continuous refractometry, and ultrasonics.

All of these sensing methods develop minute electrical signals that are proportional to changes in the variables. Various auxiliary units amplify these signals many times, and translate them into proper mechanical motions that set up indicating, recording, and/or controlling actions.

Such commercial equipment now operates on electrical impulses as low as 10^{-6} v. and currents as minute as 10^{-15} amp.

▶ **Nuclear radiation** is used in radically new control application. Here, a constant, low-level emission source directs radioactive energy toward a cell that converts it directly into electrical energy. Anything between the source and the cell affects amount of energy striking cell. Final electrical energy produced is inversely proportional to the interfering substance.

Radioactive gages now measure specific gravity, density, percent solids, thickness, liquid level, solid level, liquid-liquid interface location, liquid-solid interface location, concentration of alpha, beta, gamma, or neutron radiation, and variation of particle size in granular materials.

Potential uses here are limited only by creative imagination and the necessary safety measures. Level of radiation is very low—so low, in fact, that no radioactivity is imparted to product, yet, signals can be sufficiently amplified to give very close control.

A typical cell generates 2×10^{-15} amp. when exposed to radium-radiation of one milli-roentgen per hour. When this cell is used with a standard electrometer on its most sensitive range, 10% of full scale corresponds to 0.005 mv. per hr.

Radium, cesium 137, cobalt 60, and other isotopes, have been used as radiation sources. Also available are strip sources, where radioactive material is distributed evenly over the length of a holder. Here, sources are selected for the particular requirements involved.

To measure density of a substance with a variation in specific gravity of 1.0 to 1.2 would require a cell generating a current of 10 units for gravity 1.0. This cell could be selected so that it would generate 8 units for gravity 1.2.

The compensating cell is then adjusted to generate a current of 10 units, which is termed residual current. Adding, algebraically, outputs of measuring and compensating cells would produce zero output to the amplifier. As density increases to 1.2, this is a negative net increase of 2 units (termed Delta I). Amplifier sensitivity is adjusted so that Delta I produces full-scale deflection. Thus, indicator on amplifier shows full range over a variation in gravity of 0.2 units.

Cells giving 10 and 100 times this sensitivity can be selected so that extremely close measurement is available. Signals from first amplifier are fed to a potentiometer, then are re-amplified to provide adequate control power.

▶ **Continuous flow colorimeters** are a comparatively recent development in the control field, and have been used to indicate, record, or control color of flowing liquids, such as water, beer, and fruit juices. And they are quite widely used in controlling turbidity of beer and refined sugar syrup.

Assembly is mounted next to plant lines, and a portion

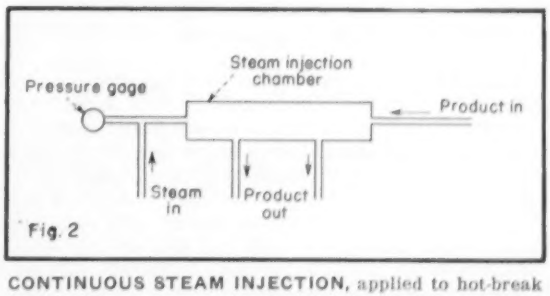
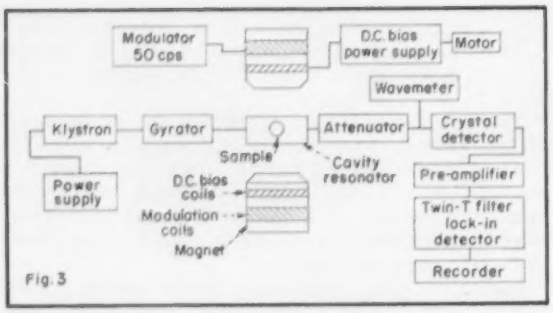


Fig. 2

CONTINUOUS STEAM INJECTION, applied to hot-break tomato juice, opposes steam and juice flow in a mixing chamber. Method reduces subsequent product filming during concentration in atmospheric pans.



PARAMAGNETIC RESONANCE unit employs microwaves and spectrophotometric methods to gage presence of free chemical radicals in irradiated foods.

of the process stream diverted through flow chamber. Amplifier and recorder may be mounted in process-control room (up to 200 ft. away). Making the by-pass sample line as short as possible results in quick response to variations in color intensity in process stream. Locating amplifier and recorder in the control room centralizes and simplifies observation and maintenance of instrument by operating personnel.

Also available, since World War II, is a tri-stimulus meter for color measurement. It employs three filters, approximating the three basic colors, and gives readings closely simulating the color-perceptive response of a human observer.

By objectively measuring color with instruments such as these—then comparing instrument results with consumer tastes—it has been generally found that a single, or at most two, of the color dimensions are dominant factors in human reaction.

For example, the anthocyanin pigment of strawberries can be measured with a single color filter, and if this single measurement falls within a certain range, consumer acceptance is assured.

This particular instrument is designed for liquid products. But other types are also available for measurement of solid products.

► **A continuous refractometer** is another optical instrument now applied to in-stream process control. Up to the present, use of this instrument has been limited to reasonably clear fluids, because suspended matter upsets the optical system. It is not adaptable to tomato or citrus products in its present form. But is especially suitable for margarine, shortening, and other hydrogenated oils.

► **The hollow prism refractometer** is a variation of the preceding device. Here, light (5,461 A°) is filtered, arranged in straight lines (collimated), and passed through a hollow, prism-shaped cell, in which flows the sample.

The emergent, refracted beam is folded back by mirrors to increase beam length, then focused on phototubes. Deviation of final beam (as related to entrance beam) is a measure of index of refraction of liquid-glass interface. Lengthening the light beam increases sensitivity of this measurement.

Phototubes are of the duplex type, mounted on a carriage and free to move horizontally at right angles to the emergent light beam. Motion of carriage and assembly is controlled by a balancing servo-motor actuated by signals from the phototubes. Connected to movable carriage is a resistance slide-wire, voltage from which is fed to a strip-chart potentiometer. With an exit-ray path of 120 in. range of this instrument is 0.161 and accuracy is ± 0.0001 refractive index units. By rotating prism cell and repositioning mirrors, it is possible to cover a refractive index range from 1.3 to 1.7.

► **Yet another variation is the differential refractometer.** Light is again collimated, then passes through two adjacent prism cells—one containing a reference sample, the other a flowing test sample. As in previous instrument, exit ray is folded back by mirrors and focused on photocells. But in this case, deviation of the transmitted beam, as it crosses the interface between the cells, is a measure of the difference in refractive index between sample and reference fluid. Instrument's zero position is readily established by filling both chambers with reference fluid.

Sensitivity of the instrument is a function of the length of exit beam, prior to its reaching photocells. Photocell signals operate a balancing servo-motor. A cam-arm arrangement causes mirrors to rotate to balance position. Geared to motor shaft is an indicator needle showing refractive index. Also geared to this motor shaft is a helipot that furnishes signals to a remotely located potentiometer for indicating, controlling, and/or recording.

Temperature compensation is accomplished by maintaining an equilibrium temperature between reference and flowing samples. Pressure compensation is achieved in a similar manner.

Errors caused by formation of films on cell windows are minimized. Span range for a given reference liquid in this apparatus is 0.01 refractive index units and accuracy ± 0.001 units.

► **Ultrasonics** can be used to accurately gage viscosity, tenderness, and texture. It has been successfully applied to viscosity measurement and control of a considerable number of products which are both Newtonian and non-Newtonian in character.

An ultrasonic system comprises a probe that is set in motion by electrical pulses from a pulse generator, a pulse-limit device and amplifier, detecting and integrating filter, d.c. amplifier and a variable device providing a full scale output ranging from 0-50 mv. (which is delivered to a standard potentiometer).

4. Automation and Original Thinking

Better quality control and more economical operation can be achieved by basic applications of automatic control, declared Karl W. Mosely, W. M. Sprinkman Corp., Milwaukee.

But men planning to get fullest benefits from these devices must not be limited by orthodox thinking. For greatest economies usually come from a radically different way of doing a job.

Normally, changing the manual to the automatic simplifies a specific operation. And this is only one of the many unexpected benefits that frequently result from doing things in a new manner.

Another is sharpening of quality standards. Heretofore, quality control factors in many food products were not sharply defined, and varied over a wide range.

Inspection and quality ratings were usually left to human judgment, based on experience and feel, look, and texture of the product.

New instrumentation techniques give quantitative measurements to these values that frequently relate directly to required product quality.

5. Steam-Injection Sterilizing

Direct steam injection for high-temperature, short-time sterilization of whole kernel corn was reported by J. L. Vetter, A . I. Nelson, and M. P. Steinberg, U. of Illinois, Urbana.

Experiments involved a specially designed unit that sterilized corn in the open can. Lids were then separately sterilized, and cans aseptically sealed.

Time product took to reach process temperature (from

70 to 268F.) in No. 2 can was 45 sec. The tests showed that:

1. It took 150 sec. to destroy 5 million spores (NCA No. 1518) in a No. 2 can of corn subjected to 269F. steam.

2. There was no significant difference in flavor, color, and texture of frozen and steam-injection sterilized cans of corn immediately after processing. But after 4 months' room-temperature storage, steam-treated canned corn did not rate as well in respect to flavor as the frozen product. No differences could be detected in color and texture.

6. Steam-Injecting Tomato Juice

Pre-heating tomato juice by continuous steam injection prior to concentration was topic of another paper prepared by A. I. Nelson, M. P. Steinberg, J. N. McGill, and J. L. Velter.

Here are the significant points:

Concentration of high-hot-break tomato pulp in making ketchup results in formation of a heavy film on heat-transfer surface. This reduces heat-transfer rate and requires special removal techniques.

The simple injection unit (Fig. 2) introduced steam under controlled pressure. A variable speed pump forced the juice through an injector and holding chamber of varying length. Only test variables were juice temperature and holding time.

Control and pre-treated juices were then concentrated to one-third original volume in an atmospheric cooker. And amount of film deposited was determined by recording batch concentration time and by inspecting heating coils.

Result—Raising juice temperature in the injector and increasing holding time reduced filming.

Heating juice to 280F. and holding it at this temperature for 3 min. proved most satisfactory in curbing film formation.

7. Electron Paramagnetic Resonance

Dramatic preliminary results were presented to show how electron paramagnetic resonance (EPR) techniques can be used to detect free chemical radicals in irradiated substances. Paper was delivered by Mr. O'Meara and Thomas M. Shaw, Southwest Research Institute, San Antonio, Tex.

Many undesirable changes in irradiated foods, it is believed, are due to reaction of these factors. Hence, detection and identification of the radicals is the first step in studying their formation and subsequent interaction in foods.

EPR spectroscopy is based on unique magnetic properties of unpaired electrons in free radicals, and it seems a promising, nondestructive way for detecting free radicals in their natural state.

Here's how it works: Resonance absorption of microwave energy by a substance in a resonant cavity and strong magnetic field results in spectral lines (Fig. 3). Frequently, intensity, and shape of these lines can be related to types and amount of free radicals in a sample.

Observed free radicals seem to be produced by direct action of ionizing radiation on dry constituents of a sample. It's doubtful that any of the observed spectra come from intermediates like atomic hydrogen or the hydroxyl radical.

Stability of free radicals is strikingly dependent upon moisture content. And in very dry solids, they may be indefinitely stable at room temperature.

Further research will probe other factors that affect yield and stability of free radicals during and after irradiation. Moreover, study will be extended to frozen systems in which less-stable radicals can be trapped long enough to permit detection.

8. Freeze Cleaning

Selective freezing of moist food waste (skin and scales from fish, vein from shrimp, silk from corn, etc.) to a clean, refrigerated metal surface appears to be a promising substitute for some present hand operations, according to N. W. Desrosier, Purdue U., Lafayette, Ind.

An example is use of the Frost Cleaner-Peeler for skinning and boning cooked poultry. Unit comprises a revolving, refrigerated, metal drum and scraper blade. The drum makes one revolution every 10 sec.

Another suggested application for the device, is for continuous cleaning of peas and beans (Fig. 4).

Enzymes Restore Food Flavors

Supposedly lost flavors in dehydrated and other processed foods have now been restored to their full, natural state. Such was the important evidence presented to IFT men by a research team from QMC, Natick, Mass., and Evans Research & Development Corp., New York City. Researchers are Dr. T. Hasselstrom, Dr. E. J. Hewitt, Dr. D. A. M. Mackay, and Dr. K. S. Konigsbacher.

Prime objective of the study was to make dehydrated cabbage more palatable. Success was achieved by treating the vegetable with water and an enzyme preparation derived from mustard seed.

Broadening the investigation, the mustard extract was applied to dehydrated watercress with similar results. Typical odor and fresh taste of the product was immediately regained.

Further work with processed foods such as peas, celery, leeks, spinach, pineapples, onions, tomatoes, oranges, bananas, milk, and carrots proved out the general application of the new principle.

The scientists stressed the need for finding suitable sources rich in the specific enzymes necessary for each product. They also declared that the method would not work if process was severe enough to destroy the necessary flavor precursors.

Chemical Additives

Growing interest in additives sparked a question-and-answer panel discussion at one IFT session on current status of these chemicals in foods.

Panel group consisted of B. L. Oser, H. C. Spencer,

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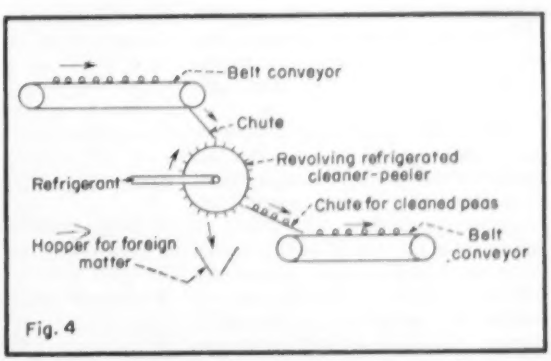
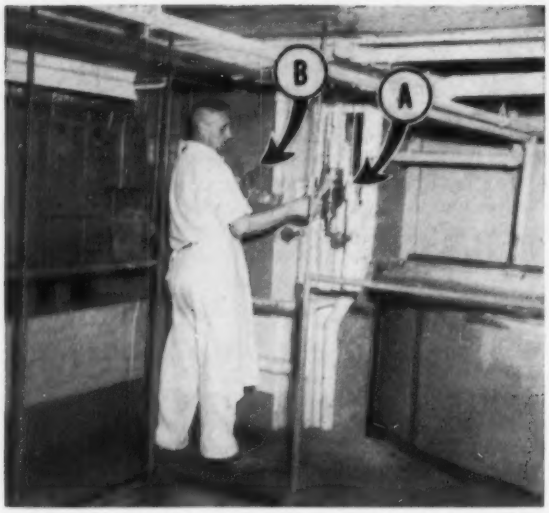


AUTOMATIC FREEZE-CLEANER, used on pea line, separates waste materials by freezing them on a rotary, refrigerated drum. Peas pass over rolls, scraper removes chaff.

1 PORTABLE SIFTER (foreground) feeds dry ingredients directly to 2,500-gal., agitator-equipped, stainless steel fermenting vat (rear).



2 WATER of desired temperature is obtained by mixing hot and cold in unit (A). Then it is metered (B) into fermenting tank (right).

Liquid Ferment System Perks Up Bakery Performance

It fits into plant modernization program by bringing notable savings in raw materials and labor. Also reduces: (1) Hazards due to breakdowns and unexpected work stoppages, (2) dough-mixing time, (3) floor time, (4) number of dough troughs, and (5) sales risks

HAROLD McGHEE, WILBUR C. DREWS, and CARL KANDLBINDER
Bakery Manager, Plant Engineer, and Bakery Superintendent, National Tea Co., Chicago

MORE THAN a year ago, our bakery department at National Tea Co. installed a highly efficient, money-saving method of making bread and rolls.

Called the liquid-ferment process, the system replaces the conventional sponge operation. It makes bread through use of a "brew" (natural fermentation products).

When we first considered this process, some savings seemed obvious and still others possible. In any event, we needed to make a modernization change, and there couldn't have been a better time.

The mixing and dough rooms in our 32-yr.-old plant were among the chief bottlenecks. Also, two of five dough mixers in the original installation could no longer be suitably reconditioned.

But with the new process, only 3 mixers were required.

What Was Wanted

Before proceeding, we had to make certain that the new process could be used to—

- Make all products without formula changes.
- Turn out finished baked goods of the same high quality as the original ones so as not to adversely affect established consumer acceptance.
- Provide sufficient flexibility so as not to hinder us in making future production changes.

Going Along With It

The switch was just the shot-in-the-arm our bakery-modernization program needed.

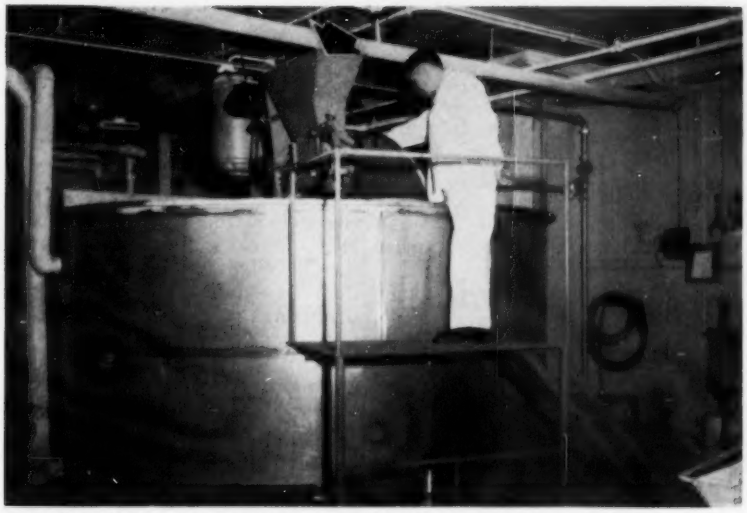
And notably, it took us only ten months to pay for the installation through the savings from direct operating costs.

Most significant saving was in ingredients. For the process is not critical relative to flour, and so this major ingredient can be purchased without the necessity of relying on rigid specifications for protein content or mixing tolerance.

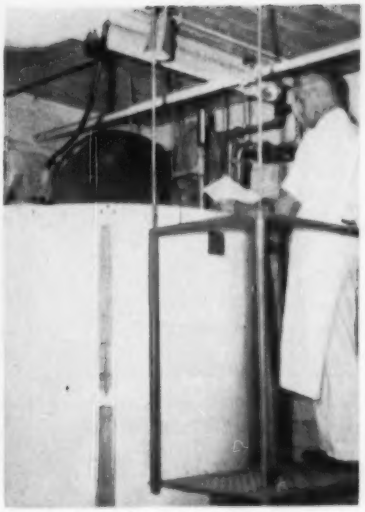
While secondary, labor savings are substantial. One man prepares the ferment. And the dough takes only one instead of two "trips" to the mixer — thereby eliminating dough-trough hoist and two mixers in the new routine.

Also, the number of dough troughs moving in and out of the fermenting room has been reduced from 50 to 6 because of the very short rest time in this room.

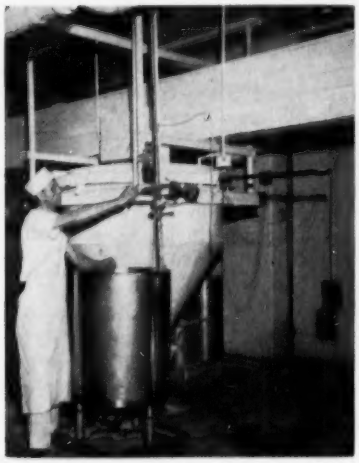
Absorption (amount of water dough



3 FERMENT for 1-1/5 days' bread-making is pumped to this 3,500-gal. refrigerated storage tank. Chemical feeder (arrow) continuously adds trace amounts of sugar to keep yeast active.



4 MODIFICATION of ferment for rye and French breads is carried out in this 300-gal. tank.



5 PORTABLE vat measures ferment in batches for delivery to mixers installed on floor below.

6 MIXING TIME of doughs is cut to 7-8 min. my adding more fungal proteases and using shorter-mixing-time flours. Then doughs get a 30-min. floor time before going to make-up department.

picks up during mixing) is greater, while invisible losses are reduced. Credit for the latter might be traced to reduced fermentation—2-hr. time in the new as against 6-hr. using conventional methods.

Chance of production losses due to unexpected breakdowns or work stoppages are minimized. Now the ferment can be held in the refrigerated storage vat. However, we'd certainly run into trouble trying to hold sponges too long.

Least looked into—and probably the greatest beneficial potential—is increased flexibility in production control. This could be brought about by shrinking the period between maximum adjustment of orders and dough-mixing time. Naturally, such flexibility could result in smaller sales losses.

Some of the Findings

Here are some of our observations after using the liquid-ferment technique to make about 50 million pounds of bread:

1. "Cheesy" off-flavors can be traced, as before, to poor sanitation practices.

2. Dough-mixing time was slashed from 11-12 min. (conventional method) to 7-8 min. It's done by using more fungal enzymes and by purchasing flours that mix in a shorter time.

3. Cool- or normal-temperature (79-80 F.) doughs that were made the liquid-ferment way produced better and consistently more uniform breads than higher temperature ones.

4. As to flour, the process is not as critical as other methods since, as stated, it's possible to use a much weaker one requiring less tolerance and mixing time.

5. The ferment does deteriorate during storage. But if carefully handled, this is almost unnoticeable within 24 hr. Up to 48 hr., it presents a problem no more serious than 2 to 4 min. of additional final steam proofing. After 48 hr., it is quite noticeable, but here it can be offset through care in shop handling. More than 72 hr.

7 CLOSE-UP shows activity of fermentation during agitation.

of storage, as regular practice, is inadvisable.

6. Light or heavy diastatic adjustment of flour apparently has little, if any effect upon gassing power or speed of dough fermentation. But higher diastatic levels do produce softer breads.

7. Just-as-good bread can be made with or without milk solids in the ferment. No milk solids, or less than 4%, calls for a buffer.

8. Results are better using superheated milk solids.

9. Maximum permissible bacteria count (50,000 per g.) in extra-grade standard milk solids probably won't cause any trouble in conventional bread-making, but it can be detrimental to ferments stored for any length of time. Solids meeting the standard, but with a count anywhere over 3,000, can bring about trouble after 12 hr.

10. Temperature changes should be gentle, since ferment is "alive" (with living yeast).

11. Most costly error for a bakery considering liquid-ferment technique would be to carry out on-the-spot experimental process adjustments, at full capacity, in a production-size fermenter. It is wise for bakers to install an experimental-size vat.

How It Progressed

Step-by-step, here's how we came along with our development:

The idea of using a liquid ferment for bread making was initially looked into by our laboratory about 4 yr. ago. But because of other more pressing work at that time, further research was dropped.

Soon after, the production department ran 3-gal. batches of ferment in the lab, and then used this ferment to make small amounts of test doughs. Results proved promising. But we knew that working with small doughs is not the same as running production-size batches in the bakery.

Our next step was to request $2,000 for further experiments. This granted, we expended $500 on a second-hand stainless steel tank with agitator and overhead motor drive. With the tank cleaned up after making a few minor repairs, we next installed a spare water meter, indicating thermometer, and immersion-type heater.

Since we didn't have enough refrigeration capacity for dough mixers, we took what seemed like an unscientific step—that is, we used a concentrated ferment. However, this actually resulted in a very efficient process.

Work was carried on cautiously at the start by running one-fourth commercial-size batches of dough. This continued until we felt we were close to producing satisfactory bread.

Next we prepared full-size batches of dough, then three batches at a time, and finally, for almost a year, about 20,000 lb. of dough daily. During this time, we tried many test variations.

Now we were set to work out specific methods for each variety of bread. Here, no effort was made to separate the 20,000-lb. of brew-made bread from conventional breads. And it was significant that neither a compliment nor a complaint reached our desks.

Thus we became certain that we could produce our entire line of breads by the liquid-ferment process, and still be prepared for changes.

Our engineers estimated it would cost less to build a brew room—along the same line as pilot-plant equipment—than to replace the two 32-yr. old dough mixers. Top management agreed, and so the new facility was built on the spot, to specifications by a competent stainless steel fabricator (Lepley Process Equipment Co., Chicago), a plumbing engineer, and our own machine-shop men.

And so we have not set a sponge since Jan. 1955, when our entire bread and roll line was switched over.

Dough-room equipment was torn down. And dough troughs and overhead monorail in fermentation room were sold. Now we use only six dough troughs to handle production to two tunnel ovens.

About the Process

The ferment (a concentrate containing 40% of water going into doughs) is produced independently of other bread-making operations. It's made five days a week, with each day's batch sufficient for 1¼ days' production to take care of our 6-days-a-week schedule. Ferment made up each day is mixed with any left over from the previous days.

Our bread formula is an average type calling for Southwest flour, nonfat milk solids, fat, sugar, yeast, salt, ammonium chloride-calcium sulphate-type yeast food, and fungal enzymes.

Step-wise, here's how the ferment is made:

Hot, cold, and tap waters are continuously fed into a small mixer, where they are blended to 105F. Then the water is metered into a 2,500-gal. stainless steel fermenting vat until it is ¼ full (level at which agitation is greatest).

The vat is equipped with a vertical, 3-bladed (6x20-in.) agitator, driven by a 10-hp. motor through a 50-105-rpm. variable-speed drive. The agitator, guided by a Nylon bearing mounted

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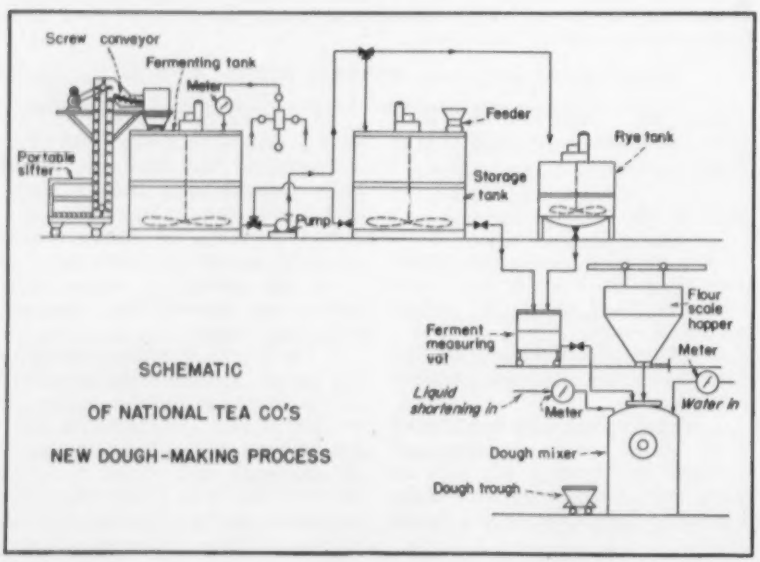
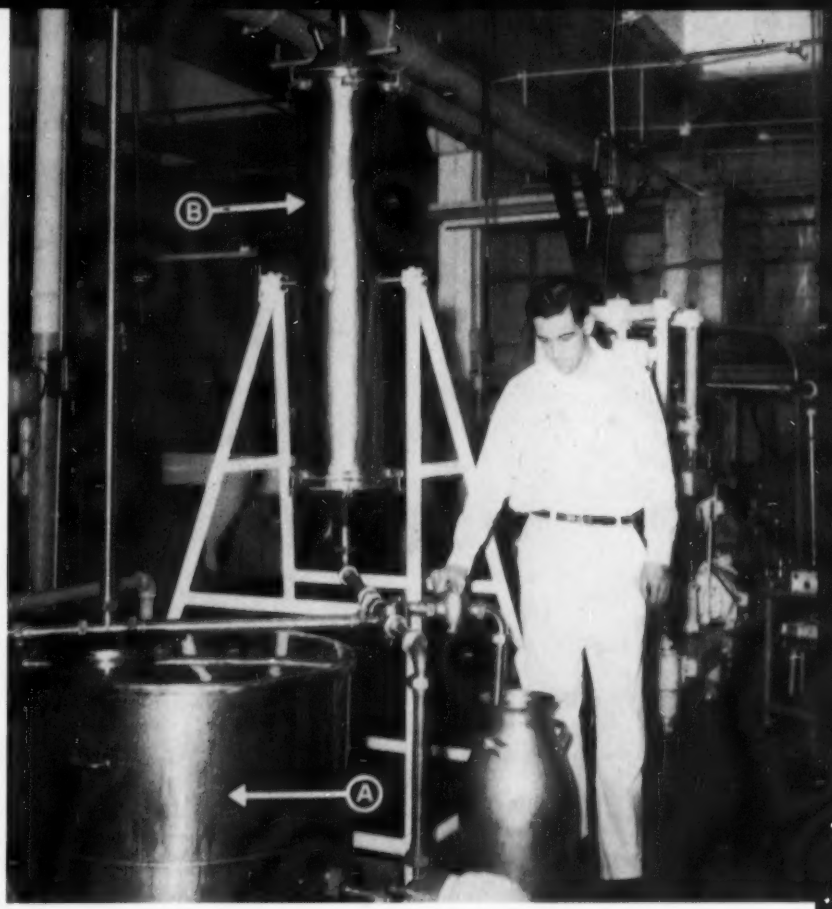


SCHEMATIC OF NATIONAL TEA CO.'S NEW DOUGH-MAKING PROCESS



LOW-SODIUM MILK is prepared by pumping raw product from stainless holding tank (A) through sanitary type ion-exchange column (B). Here, synthetic plastic resin removes a full 90% of the sodium ions.

Chicago dairy uses distinctive techniques and equipment to make lesser-known items that meet dietary, therapeutic, and geriatric needs. . . . Details cover low-sodium, enzyme-digested, and acidophilus milks.

Dietary Specialties 'Tailor-Made'

ROBERT G. MOREY and JOHN V. ZIEMBA
Respectively, Vice-President, Brook Hill Farms, Inc., Chicago, and Associate Editor, "Food Engineering"

A unique and barely-tapped market is now being filled in the dairy field by Brook Hill Farms, Inc., Chicago.

• This special operation is the "tailor-making" of dairy products to fit specific needs of infant, convalescent, geriatric, and diet-conscious consumers.

Manufacture of the items, supplied to delivery-route dairies, requires particular techniques and equipment, also trained personnel. Thus, their production in limited volume by individual dairies would be too expensive.

Through the franchise organization (Medical Dairy Specialties, Inc., 5230 N. Milwaukee Ave., Chicago), Brook Hill promotes the products through detail men, who contact physicians and hospitals.

Extreme care is exercised in handling the raw milk destined for the products. About one-third comes from the company's own nearby Wisconsin farm, where up-to-date milking parlors and bulk-tank systems are employed.

Milk is first stored in refrigerated, stainless steel farm tanks, then hauled to the Chicago plant in a stainless, 2-compartment truck. One of the compartments carries 1,400 gal. of certified milk, the other 2,400 gal. of Grade A. Remaining requirements for Grade A milk are filled by the Pure Milk Assn.

Now to the specific products—what they are, why they are produced, and how they are made:

New Acidophilus Milk

For a long time, milks containing *Lactobacillus acidolphilus* have been consumed to aid formation of proper human intestinal flora. They are useful when such natural flora are upset by chemicals and yeasts, or in the event the intestinal tract becomes sterile. Research shows that the milk must have 200 to 300 million viable *Lactobacillus* organisms per milliliter to replace undesirable putrefactive and toxic strains in the intestinal tract.

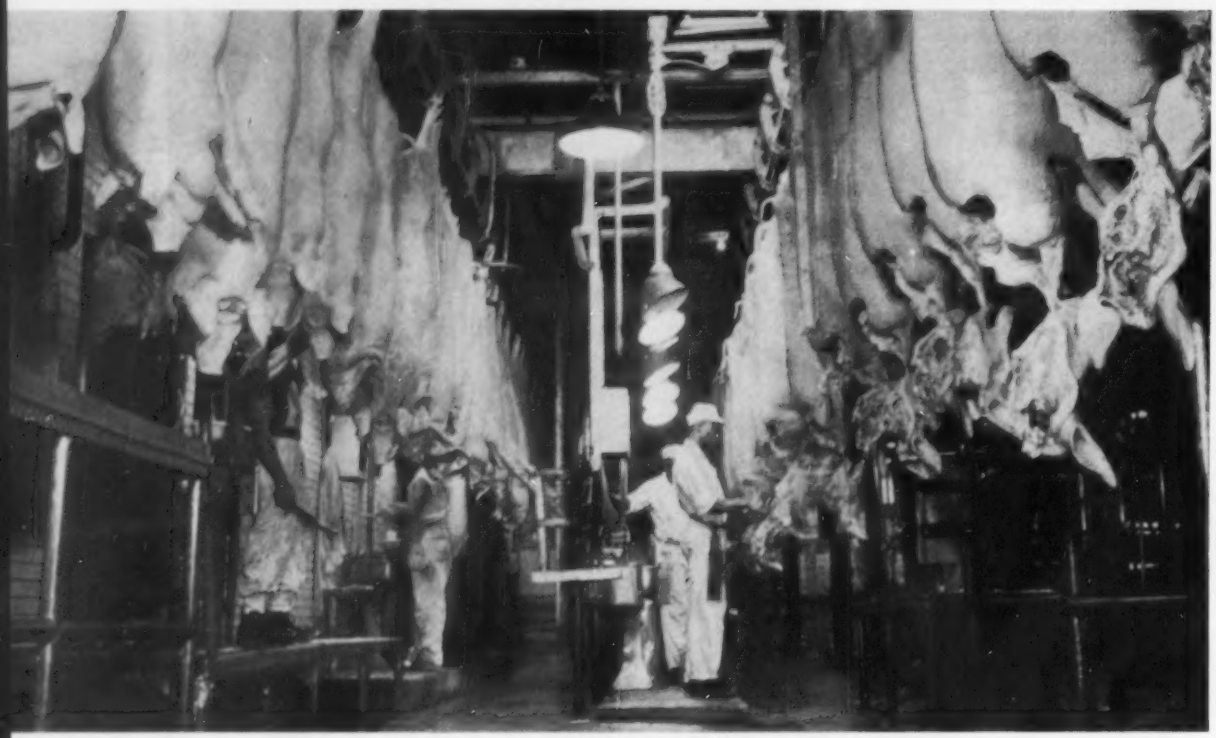
This lactic-acid former—a rough X-type strain of human variety—is the only one of the milk-fermenting kind that can survive stomach acids. However, the sour taste of this product has caused its market to steadily decline in late years.

But now re-capturing this lost market is a palatable, sweet-flavored product, called Bac-T (franchised by Medical Dairy Specialties).

To prepare this fermented milk, a 200-gal. batch of 2%-butterfat milk is pasteurized for ½ hr. at 190 deg. F. Then there are added 12 oz. of vanilla custard flavor, 4½ qt. of a 1% *lactobacilli* concentrate, and 30 lb. of cane sugar.

Desired acidity (0.75 to 0.80%) is produced in 14 to 15 hr. And milk averages 500,000,000 organisms/ml. at the end of the 4-day process. Break-

(*Turn to page 168*)



NEWEST hog-dressing line sets pace by handling 600 hogs hourly.

ARMOUR'S BIG MODERNIZATION

★ Wins Efficiency-Plus ★ Trims Costs All Along Line

Radical re-do of facilities sees obsolete buildings razed, remaining ones streamlined—compacting line operations for new top performance . . . Notable maintenance savings are clinched by switch to single-floor routines . . . New strides in meat packing sparked by advances in unit operations, techniques, materials handling, packaging, refrigeration, and shipping—accounting, too

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

"WE CERTAINLY haven't been shrinking Armour's Chicago meat-packing operations since initiating our major modernizing program in 1954. On the contrary, we're streamlining these operations to improve our identity and position in the meat-packing business."

This, in a nutshell, is the sum-up by F. W. Specht, president and chairman of the board, on the company's efficiency-promoting moves.

First off, these changes called for reducing the Chicago plant to 62% of its original floor space–from 7,600,000 to 4,700,000 sq. ft.

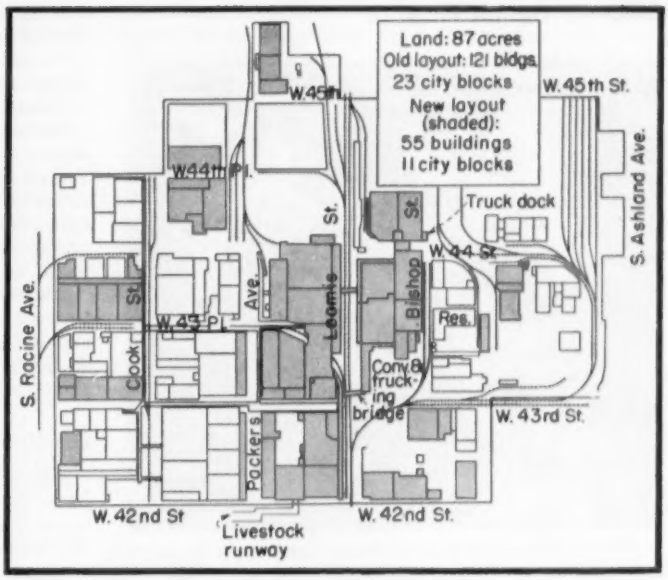
Back in '54, the non-profit-operating plant comprised about 87 acres with 121 buildings–most of them wall-to-wall in blocks of a half dozen or more 1- to 10-story buildings.

Modernizing by Subtraction

Biggest money-gouger was the hauling of products through scattered and poorly laid-out buildings. These facilities, in fact, were spread out so much that products

NEW LAYOUT SHADED-IN OVER OLD

Structures that will finally comprise Armour's newly-practical up-to-the-minute plant are shaded on this chart that encompasses all former facilities. Old arrangement made product-transport expensive, the layout being so large and buildings so scattered that long elevated runways were needed for inter-department movement of meats. New way short-cuts the hauls within smaller areas.



had to be moved between departments over long, elevated runways.

Not only that, some buildings—the best ones—were only 15 to 20% occupied. Since '54, however, about 50% of the others have been either vacated or torn down.

Both F. W. Specht and Dean Hawkins, the general superintendent, made mention of how the former flow of a single product was exhaustively traced—as a special check in the course of gaging the performance of the old operations prior to modernizing.

And amazingly it was found that the product covered as much as 1¼ miles in plant travel during necessary processing stages. Moreover, up-and-down elevator hauling wasn't included in this mileage figure.

The inefficiencies of this product-handling operation were stressed. Annual costs, as a matter of fact, ran to millions of dollars—and they were noted to be in excess of those for other reasonably efficient operations.

Careful money-saving decisions had to be made. Operations had to be confined within a minimum of space. And this called for knocking down old, worn-out buildings costly to maintain and inefficient to run—especially since operations were widely scattered.

At the time of these studies, just the reconditioning of some buildings to meet U. S. Inspection requirements would, top management found, cost about $6,000,000. Yet even though such an expenditure amounted to nearly half that put into the modernizing program, it would not have included new operating efficiency.

As it worked out, good use was made of some substantial concrete and steel buildings that were well located and only partially used.

Boiled down to common denominators, savings in work and maintenance came about through contraction of operations and utilizing new equipment and processes in the modernization, according to Mr. Specht.

Simplified Handlings

For example, five to six handlings of meat have been eliminated through improvements in curing processes and advanced mechanized handling. What's more, curing is now consolidated within three connecting buildings, whereas formerly it was spread out in seven.

Moreover, new hog-processing facilities are now confined to one floor instead of being scattered throughout five as in the old layout.

Most of the $11,000,000 disbursed as of late '55 went toward relocating old key facilities and setting up complete new ones for hog-slaughtering and pork-cutting. Additional important expenditures were made for enlarging the sausage kitchen, installing latest meat-curing equipment in new locations, and putting in 25 modern stainless steel smokehouses of the single-story type.

There have been significant savings in repairs and maintenance through the demolition of certain buildings (see drawing). Here is the record: Removed 14 obsolete structures; to be torn down this year, 11 others; and to be razed in the future, 27. Further, 5 buildings have been sold and 9 rented.

Buildings being retained in the modernized plant number 55.

As stated, hog slaughtering and dressing facilities have been streamlined to handle up to 600 hogs hourly on a single floor.

Operations are straight-through, with hind-leg shackling of the hogs to a chain hoist that carries them to the sticking and bleeding rail. Hogs are subsequently conveyed through a scalding vat equipped with automatic

HAMS from cutting and trimming lines slide down stainless steel chute for sorting into different weights.

Efficient Bacon Line

IN STRAIGHT-LINE fashion, bacon sides are conveyed on this stainless steel "disassembly" line for trimming.

SPARKLING-CLEAN section of 15 stainless, single-story air-conditioned smokehouses for bacons, hams, and other meats. Ample working space is a feature.

ALMOST 4 tons of bacon can be machine-sliced, weighed, and packaged hourly in this completely modernized room.

duckers that submerge and move them forward through the 138F. tank of water.

Carcasses continue, in succession, through de-hairing, depilating, singeing, polishing, and washing machines, and then past butchers for different dressing operations.

During travel via overhead rails and a series of conveyors, heads are removed and carcasses are opened. Farther along, the bung gut is dropped and tied. Viscera are removed and placed in stainless steel pans traveling on a conveyor (movement synchronized with 'rail movement of carcasses) past inspectors. Carcasses are split and 'railed to coolers, to be ready for pork-cutting operations.

Meanwhile, viscera are conveyed from eviscerating line to other belts where: (1) Hearts and livers are trimmed and transferred to chill room; (2) stomachs are washed and chilled; (3) casings are recovered for sausage operations; and (4) inedibles (lungs and fat) are salvaged.

Continuous Pork-Cutting

Advanced methods—notably product handling—and latest processing equipment mark the new pork-cutting operations. But close supervision between sales and this department is the key to efficiency, production of the various cuts being changed as required to meet current prices in a fluctuating market.

Pork carcasses are now directly monorail-transported from temperature-controlled chill room and onto the highly mechanized line within a far shorter distance than previously. Separated on this line, in continuous fashion, are such cuts as hams, loins, ribs, shoulders, bacon sides, etc., as carcasses move along on a stainless steel, slat-type conveyor flanked on each side by skilled workers.

Labor-saving and quality-maintaining units on this straight-through "disassembly" line comprise saws to cut off feet and separate hams, shoulder cut-off knife, circular rib saw, loin holders, belly roller, rib scribers, and rotary circular knives to separate bellies from salt pork.

Significant, too, is the mechanized fashion of diverting separate cuts onto lines installed at right angles to the main pork-cutting conveyor. Here, such cuts are trimmed and prepared for further processing or packaging.

Briefly, here's how the various cuts are prepared for final processing on these lines:

Handling Hams

The hams are diverted onto a trimming line, with trimmings going to the sausage kitchen and fat to lard-rendering melters. From here, processing of trimmed, skinned hams is then carried out on four different lines, depending upon whether they are to be cured, canned, baked, or boiled.

Hams are now chuted onto a 50-ft. grading table containing a battery of scales, and then sorted directly into 1,500-lb.-capacity, pallet-type, stainless steel dump boxes.

Labor is saved by the well-engineered technique employed in moving hams to curing stations. Fork-lift trucks haul box-loads of graded hams to a battery of stainless steel hoppers feeding pickle-pumping stations.

The boxes are designed so that their legs rest upon an inclined angle iron mounted on each feed hopper, and hams drop from the boxes into hoppers for chute-delivery onto pickle-pumping tables. Pickling solution is gravity-fed from 10,000-gal. make-up vats.

Hams are then loaded into 1,500-lb.-capacity vats for curing, following which vats are transferred by fork-truck to a continuous washing line—another cost-cutting move that also abolishes workers' back-breaking chores.

Each vat is hoist-raised and tilted so that hams drop onto a dump table and then proceed via conveyor through a mechanized washer with a series of spray heads. Hams

are then branded, slipped into cotton stockinettes, and loaded onto smokehouse trees before continuing through the single-story smokehouses and chill rooms.

A battery of 15 new smokehouses can handle 1,500,000 lb. weekly of hams, bacon, and other smoked meats. Each smokehouse is equipped with a gas-fired, sawdust-burning smoke-generator. Instrument control of temperature and humidity of these 'houses is fully automatic. Variations in temperature within each self-contained unit is less than 4F., which is far more precise than the 20F. variations in the former, old-style 5-story houses.

A few words about other hams: Bin-loads are fork-trucked to separate and nearby departments, where they are: (1) Packed into cans and heat-processed in instrument-controlled pressure retorts; (2) baked in ovens, cooled, and packaged; and (3) boned after curing and prior to stuffing into the metal molds, then immersed in stainless ham-boiling vats, cooled, and packaged.

Cured hams for boiling are trucked to a 50-ft. boning conveyor. Stuffed into ham molds, they are cooked in 500-mold-capacity ham boilers.

Three Other Trim Lines

Loins and ribs proceed to separate lines. On one, loins are trimmed, graded, wrapped, and packed into parchment-paperlined wire-bound crates, and weighed. On the other, fresh ribs are trimmed, packed into paperboard cartons, and weighed.

On still another line, shoulders are separated into picnics and Boston butts. Picnics go onto a trimming table, where jowls are cut off for sausage-kitchen use. Trimmed picnics are then cured, washed, smoked, chilled, and then packaged.

Butts are trimmed (trimmings for sausage kitchen), graded, and packed into wax paper-lined wire-bound crates.

Others are cured and then loaded by a pneumatically operated stuffer into cellulose casings, each holding three butts. Butts are twisted-separated into each casing, which is then slipped into a stockinette and mounted on smokehouse trees. In this case, use of one stockinette, instead of three, also simplifies handlings.

From the chill-room, smoked butts are delivered to a Cry-O-Vac line for snug-packaging into Cry-O-Rap bags. Butts are hand-fed into these bags, which go to a motor-operated, semi-automatic vacuum-sealing machine. Here, the open end of the bag is slipped over a nozzle. Vacuum is pulled and the nozzle spins to twist the bag.

The twist-part of the bag is transferred to jaws of a crimping machine that seals the bag with roll-fed aluminum clips. Excess twisted end is snipped with a cut-off knife. The bag is conveyed through a shrink tunnel (5-ft. long) for a 3-sec. dip in 200F. water, then it's forced-air dried.

Final cuts coming off the 250-ft. main pork-cutting line are the bellies, along with salt pork and fat-backs (some rendered into lard). Bellies drop onto a 75-ft. conveyor, where workers scale-grade them for bulk-loading into heavy-gage, wire-constructed pallet-type containers.

At this point, fork-lift trucks simply transfer the latter to where they are conveyor-fed to fully automatic machines which, through 24 hollow needles, inject curing solution into the bacon sides. The new cure-injecting has slashed processing time from 25 to 4 days.

Pickle-pierced bellies are loaded into 1,500-lb.-capacity curing vats similar to those for the hams. And here, too, significant progress has been attained through speedy, efficient handling of heavy, bulky bellies, with the further object of eliminating the old heavy manual labor.

Formerly, bellies had to be separately overhauled—each piece hand-transferred from one vat and into another. Now, however, specially designed fork-lift trucks do the job. They have built-in, hydraulically operated clamps that fit around these round vats. The vats are raised and tilted so that bellies drop into a portable metal truck as curing solution pours out onto a well-drained floor.

Trucks also move vats of cured bellies to the dump table mounted ahead of the conveyorized and mechanized washing line. Here, a sprocket-mounted chain raises the vat-load of bellies. Operating a pushbutton, a worker tilts the vat to drop the bellies onto the dump table.

Continuing through the sprayer washer, bellies are secured to stainless steel toothed combs which, in turn, are hung upon trees going through the smokehouses and chill rooms. Skins are machine-removed from the smoked bellies. Bellies are hand-fed beneath a roller and against a knife edge. The operation is easier to carry out at this stage than prior to smoking.

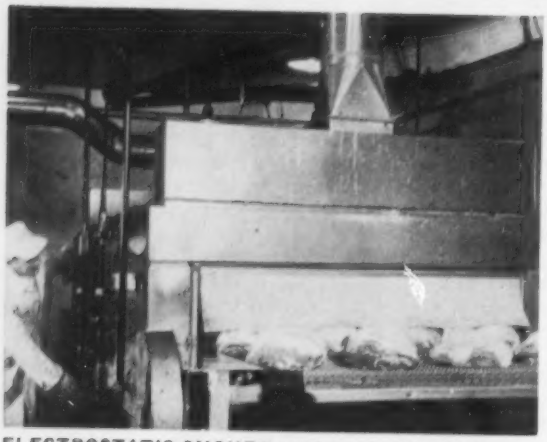
Slabs are now ready for slicing and packaging. They are fed into hydraulically operated bacon presses that "square them up." Pre-formed slabs are loaded onto flats for battery-powered hand-truck delivery, in labor-

Efficient "Handlers"

FEEDING of meats and other ingredients into latest chopper is facilitated by hoist that raises specially designed stainless containers.

SPEED AND EFFICIENCY have been engineered into handling of heavy, bulky materials. Here dumper unit easily lifts and tilts 1-ton vat of meat in cure.

Two Advanced Units



ELECTROSTATIC SMOKER employs electrically-charged smoke to add distinctive color and flavor to canning hams and other meats.

FIRST Commercial Turbo Chill unit was installed (above) in Armour plant. It cuts chill time, reduces shrinking, saves cooler space, improves meat appearance.

simplifying manner, to the high-speed bacon slicing and packaging department.

4 Tons an Hour

Turned out in this spic-and-span area (stainless equipment and tile walls) are up to 30 lb. of sliced bacon per minute from each of four slicing machines. On an hourly basis, this mounts up to a capacity of 4 tons of sliced, weighed, and packaged bacon per hour.

Four packaging lines are devoted to weighing shingle-stacked slices (from slicing machines) in ½- or 1-lb. units onto paperboard flats that are conveyed to machines that overwrap them with transparent film at up to 60-per-min. rates.

On a fifth packaging line, scaled shingled slices are vac-bagged on an 8-head, rotary machine at a speed of 2,400 packages hourly (See *Food Industries*, Dec. '50, p. 38). Method of Flex-Vac packaging (a cooperative Armour and machinery manufacturer development) notably extends product shelf-life and checks discoloration while the goods are on display in retail stores.

Some smoked slab bacon, along with cured and smoked hams, proceeds from the chill room to a cooler-room packaging line. From here, special paper-wrapped slab bacon and hams travel along a reversible belt running between two rows of ten double-decker selecting bins in the shipping department.

Previously graded (for size or weight average), bacon slabs and hams are loaded into these sorting bins to simplify order make-up. The belt's movement is reversed to carry these smoked meats from the shipping department into mechanically refrigerated trucks.

Electrostatic Smoking; New Sausage Kitchen

The newly installed electrostatic smoking unit is producing smoked hams for canning luncheon meats and similar products heretofore not smoked. When running on hams, this radically different smoke unit can handle 7,500 lb. hourly.

Smoke generated from burning hardwood is forced into the unit's stainless steel enclosure in controlled volume. Electronically charged (12,000 v.) smoke particles then come in contact with conveyor-fed meats to impart color and flavor.

A "new look" has been engineered into the new million dollar sausage kitchen, where the latest equipment has been aranged for short, unimpeded product flow. The kitchen is geared to turn out, without any hitches, nearly 500,000 lb. of products weekly.

Advanced units comprise meat grinders, mixers, and vacuumizing chamber, along with a monorail-hoist system for feeding ground meats into silent cutters. Other units include stuffers, hooked to automatic machines that turn out 140 links per min. Adjacent are the meat-holding cooler and spice-seasoning scaling room.

Set aside exclusively for sausage products are ten new stainless steel, single-story smokehouses, with temperature and humidity recorders and controllers. Products "monorailed" into these houses are either suspended from smokehouse cages or loaded onto racks. Next to the smokehouses are a stainless steel Jordan cooker and partially enclosed spray-nozzle type washer.

Packaging Franks

Now to specifics about some of the advanced sausage-goods processing lines:

After smoking, cooking, showering, and cooling, frankfurters are transferred to the packaging cooler room. Cellulose casings are first machine-stripped from franks at a 50-per-min. rate. The wieners are fed to the skinning machine from a stainless steel tray mounted on a casing-collecting drum.

Each 55-ft. row of linked franks passes through a series of small Formica and stainless steel rolls that guide them into reciprocating knives. The latter sever and split the casings. Another set of rolls guides individual franks through a series of aluminum rolls, set at a 45-deg. angle to remove part of the casing. Vacuum then sucks the loose casing from the wieners and into the collecting drum.

Skinless franks are now conveyed to the packaging line. Here, flow of product is systematic, with advanced handling methods and machines cutting operating costs. The line can turn out about 3,000 packages per hour.

Wieners now travel on another conveyor that is flanked on each side by girls who scale them into 1-lb. units and feed them onto a shoulder-level wire-mesh belt with separating flights. Further along, girls pick up the 1-lb. units of franks and feed them to a wrapping machine.

This unit takes cellophane from a roll and knife-slits it lengthwise. Another knife, actuated by electric

eyes that spot registration marks on the film, cuts the two lengths into sheets of desired length.

On each side of the machine's conveyor, girls place cardboard backing and pre-wrap each 1-lb. group of franks with a sheet of cellophane. Packages are then transferred to the wrapping and heat-sealing sections of the machine. Packages of franks are then packed and sealed in cartons.

On still another line, frankfurters are bulk-packaged. Here, they're first inserted, one at a time, on a notched-type conveyor that feeds them to a paper-banding machine. The unit bands them in cartridge-link units of any number with a perforated strip. Printed on each band are brand and name of packer.

Banded wieners discharge onto a stainless table, from which they are packed into cartons in 2-, 3-, and 6-lb. lots. Cartons are checkweighed before going into the shipping cooler.

Wrapping Cold Cuts; "Chubbing" Operation

About 1,800 lb. of sliced luncheon meats per hour can be packaged on two lines comprising skillfully integrated slicing-stacking machines, packing conveyors, pouch vac-sealers, and window-carton formers.

Briefly, round and square luncheon meat loaves are machine-sliced to desired thickness and automatically stacked to pre-set number on a conveyor feeding a packing line. Stacks of slices are spot-checkweighed, and hand-packed into pouches using a manual metal bag opener.

A conveyor belt carries the pouches to rotary, 8-headed vacuumizing-sealing machines that handles about 2,500 packages an hour. Packages then continue to another packing table for packing into window-type cartons set up by a carton-former. Case packing is last step.

Manufacture of chub items—sandwich-meat spreads and sausage-meat products—is now carried out continuously through installation of two sausage stuffers hooked in tandem for alternate feeding through stainless steel pipes to a chub-packaging machine.

Pressure applied to stuffers feeds in the meat. Product flows into continuously formed tubular-shaped Saran packages. Flow (and thus weight of product going into packages) is controlled by a sanitary, positive displacement pump.

The Saran is roll-fed over a tubular package former-filler. The film forms into a tube around a mandrel as product is filled through it and into the package, which is aluminum clip-sealed. Capacity is about 30 packages per minute.

Latest Sausage Machines

A newly installed skinless pork sausage machine now automatically shapes links at a rate of nearly 8 every 2¼ sec. (See FE Jan. '52, p. 64). This machine, of course, eliminates casings and linking operation.

The efficient, time-saving extruder forms sausage meat into lengths, eight at a time, and then ejects them onto waxed paper, ready for packaging.

A new machine in one of Armour's seven large canning kitchens automatically and simultaneously slices seven lengths of Vienna sausage to exact size and gently stuffs them into a can—an operation formerly done by hand (See FE Aug. '52, p. 82). The unit handles up to 15,000 cans an hour.

Revolutionary Cooler

Now let's pinpoint the efficiency-promoting steps, some of which are based upon special ideas and inventions.

Chilling time in the beef cooler has been reduced from 24 to 16 hr. through installation of five new Turbo Chill units (See FE Nov. '54, p. 89). Gained, too, is a 0.6% savings in shrinkage—gaged, after installation costs, at a value of nearly $200,000 annually on Chicago plant beef output alone.

The new method differs from the conventional one of exposing air chilled by brine, in that moisture-saturated air is circulated at high velocity (up to 6,000 fpm.).

Space also is saved, since sides of beef can now be hung closer together. Moreover, there is an improvement in the meat's fresh appearance as well as extended shelf-life.

Branch Houses, Too

Armour has not only undertaken to modernize its Chicago plant but also some of its other 33 meat-packing plants and 217 branch houses.

Improvements in transporting products make it possible for the present branch houses to serve much wider areas than previously. In fact, through the new transport many large buyers are now better served by direct delivery from a plant rather than branch house. Such developments have made it possible to close down 32 branches since 1949—bringing a considerable saving in expense.

Changing times have also modified the function of the branch house. When established at the turn of the century, when there were no large chain-store-operated refrigerated warehouses, the branch house was principally used to keep perishable products under refrigeration.

Yet, branches are still needed—to operate more as meat-processing establishments with facilities for fabricating and boning of fresh meat. The new ones are projected to include sausage kitchens, as well as smoking, slicing, and cooking facilities. But the warehousing function of the branches will be relatively less important.

Changes at Other Plants

Now for a word on the modernizing in other plants: The one at Memphis—operated as the Memphis Packing Co.—comprises new structures to enlarge operations. One houses a new sausage kitchen, as well as the latest smoked meat, sliced bacon, and cooler facilities. Plans call for completing other additions to enlarge and modernize slaughtering operations.

A "new look" was put into the St. Paul beef-cuts cooler —one of several completely modernized. Here, there is a brand new overhead rail system, and tile brick walls are a feature.

A new beef installation at another plant cost nearly $200,000. At this facility, power saws are used to cut sides of beef into primal parts on the rail—an operation formerly performed by hand on a block similar to a butcher's. In the same cooler, a worker operates two scales to record weights of beef ribs and loins.

While modernizing fresh meat coolers was important, perhaps the most costly phase was developing facilities for turning out consumer-size branded items, like vac-packaged sliced luncheon meats.

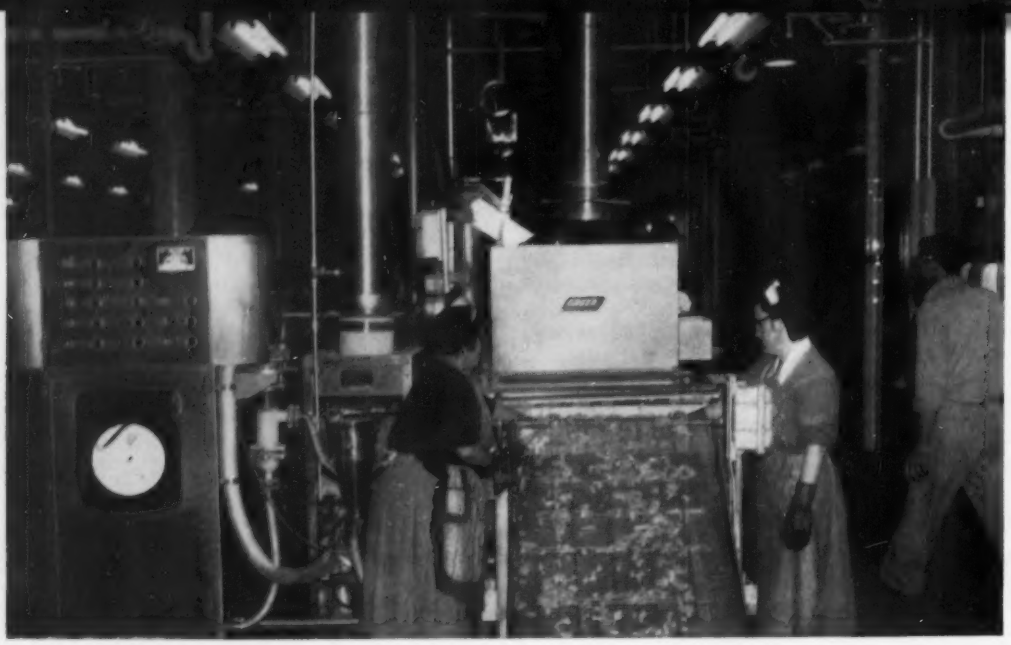
On a typical line, up to 20 varieties of luncheon meats are machine-sliced and vac-packaged at rates up to 2,520 packages hourly.

There is considerable quantity cooking of a variety of ingredients in Armour canning kitchens. In one, rows of mobile stainless steel cook tanks, each capable of handling 750 lb. of meat or vegetables, can be moved where needed without extra handling. About 10 tons per hour can be cooked in this manner.

Baby-Food Line

Armour has a joint arrangement with Gerber to produce the latter's line of chopped and strained meats for babies.

(Turn to page 197)



This New 3-Function Unit Gives—

Fine-Line Food-Density Control

There's an array of other unique ideas, too, in this newly-opened Massachusetts seafood plant, where raw product becomes top-quality heat-and-eats in 12 min. flat

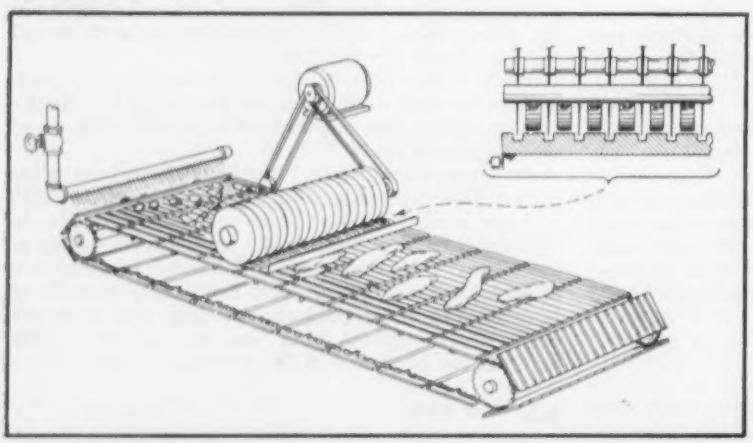
ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

PRODUCT DENSITY—vital factor in many food processes—is now put under full regulation by a triple-duty machine that (1) blends dry and liquid ingredients, (2) controls consistency, and (3) records viscosity data.

Basic application of this process aid is seen at the new million-dollar seafood center just opened in Massachusetts by Gorton's of Gloucester, Inc. (formerly Gorton-Pew Fisheries, Ltd.)

Here, the new device performs the key function of batter-density control. And it is teamed with many other late-design production units in a line forming heat-and-eat food items at 1,500 lb./hr. Included are frozen perchies, bite-size fish cakes, and French-fried scallops.

Still another line—soon to be completed—will be devoted exclusively to fish sticks.



HIGH SPEED rotary slicer (company-built) turns fillets into perchies. Aluminum plates are fastened to two chains. Grooves in plates match knives (see enlarged inset). Spray washes slices to inspection belt.

About the New Plant

Appearancewise, the interior of the modern center is a sparkling combination of red brick floors and soft-yellow ceramic-tile walls trimmed in blue (Gorton's packaging colors). Exterior is brick-faced. Reinforced concrete is the construction core of the 110x65-ft. 3-story building.

Frozen storage for the plant is provided by an adjacent public warehouse, owned by Quincy Market Cold Storage & Warehouse Co. This firm bought land from Gorton's, built both structures, and now leases the plant back to the processor.

On the point of quality, Gorton's is the first seafood-products plant to employ USDA's continuous inspection service. Its QC center is located in a glass-partitioned modular lab—set

directly in front of a visitor's gallery on the main processing floor, and convenient to all plant points.

Details on Batter Control

For food engineers, the high point of interest on the perchy line is the batter-density controller. Initial design of this unique device was worked out at Gorton's by the maker, W. L. Cummings Co., Newton Center, Mass.

Unit combines a Fitzpatrick Homoloid (blender), a Brookfield Viscometran, and a Foxboro Dynalog controller. Here's how it works.

Dry batter mix is chuted into the machine from top-floor storage bins. Inside the unit, a vibrating feeder proportions powder to the blender. The amount is controlled by amplitude of vibrations and a variable gate at the end of the vibrator.

Water-rate is adjusted by a hand valve. But there is an electric valve for automatic shut-off. Mix is brought as near to the desired end point as possible with the two hand adjustments. This cuts work-load on the Viscometran.

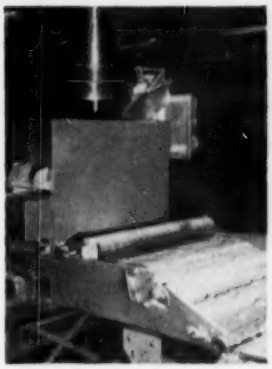
Batter circulates continuously between fish product, blender, viscosimeter, and a sump tank.

As fluid enters the viscosimeter, it flows around a spinning bob. Viscosity of the batter creates resistance to this spin, which is translated into an electrical signal and measured by the controller-recorder. If the batter is too thin, controller starts vibrator and adds dry mix. If too thick, solenoid valve on water line opens.

However, a time switch is set to permit correction for only 10 out of each 30 sec. During the remaining 20 sec., the machine waits while added ingredients are mixed.

Further, the batter sump is equipped with an electrical level probe. This is set for close cycling to minimize correction. And a cut-out relay halts filling until the batter density is "on the nose." Further, to visually inform the foreman of what is happening, a series of panelboard lights wink on and off as various cycling operations occur.

To spot other ingenious equipment on this modern line, let's follow product on its 12-min. trip from fillet to freezer.



BATTERING - BREADING unit has eccentric arm that "firms" breading onto perchies, as in hand patting.

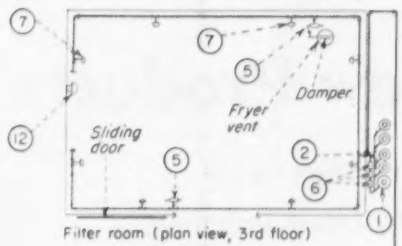
"NUBBIN" GRADER, located just before packaging operation, removes short pieces of fish. Company-made device moves product over carefully-sized holes by a reciprocating action.

Rotary Knives Cut Fish

In the basement, fish fillets, prepared in another plant, are converted into perchy slices on a company-built slicer. This is constructed of aluminum plates, joined closely together on a chain conveyor. Slots machined

(Turn to page 198)

Intricate CO_2-System Protects Plant from Flash Fires



Filter room (plan view, 3rd floor)

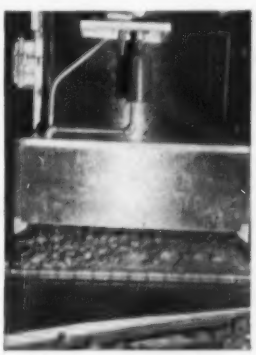
CO_2 - gas requirements

Volume of filter room = 2,916 cu. ft. = 162 lb. CO_2
Volume of fryer and ducts = 40 cu. ft. = 3 lb. CO_2
Volume of cooler and ducts = 288 cu. ft. = 18 lb. CO_2
Area of cooler ends = 15 sq. ft. = 11 lb. CO_2
Area of cooler drip = 6 sq. ft. = 8 lb. CO_2
Area of fryer ends = 6 sq. ft. = 5 lb. CO_2
Area of fryer drip = 7.5 sq. ft. = 10 lb. CO_2
Total = 217 lb. CO_2 = 5 - 50 lb. cylinders

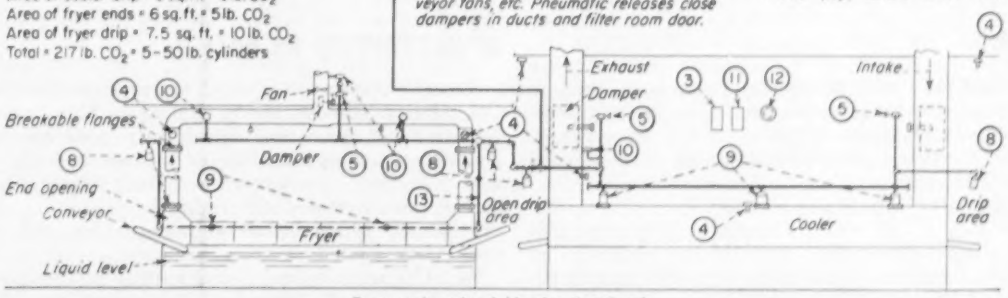
CO_2 - equipment parts

Pc. No.		No. req'd
1	50 lb. size CO_2 cylinder	5
2	Electric discharge plug with flexible connector	2
3	Circuit testing unit	1
4	Thermoswitch	6
5	Pneumatic release	5
6	Pneumatic switch (3 pole)	3
7	Baffle-type nozzle	8
8	Multi-discharge nozzle	4
9	Sealed multi-discharge nozzle	5
10	Sealed-unit nozzle	4
11	Remote electric control box	1
12	Alarm gong	2
13	Flexible hose connection	1

Note:
Pneumatic switches sound alarms and shut down all electrical equipment, conveyor fans, etc. Pneumatic releases close dampers in ducts and filter room door.

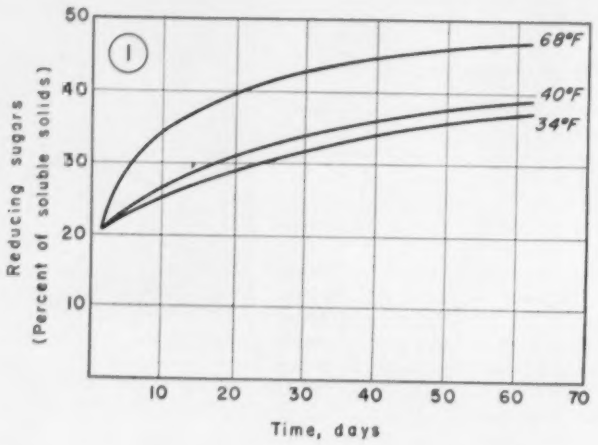


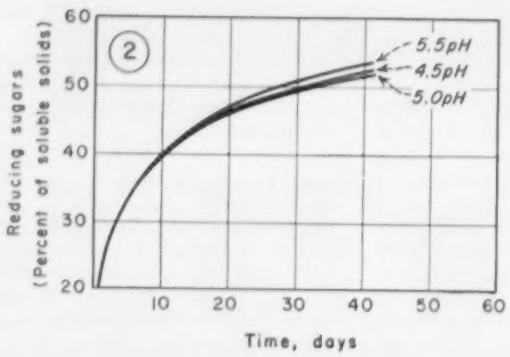
Nozzle (top) covers cooler exit.

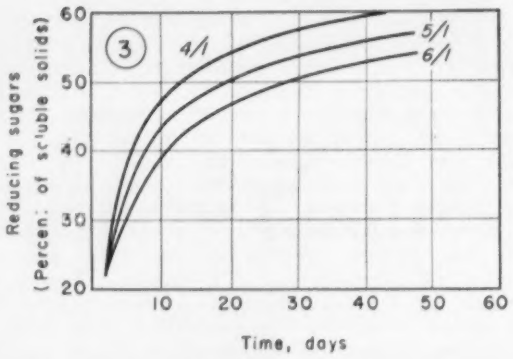


Fryer and cooler (side view, 2nd floor)

HOW Storage Temperature, pH, and Cream-Cherry Ratio Affect Liquefaction Rate Of Cherry Cordial Centers







GRAPHS show (1) reduced inversion at lower temperatures, (2) little change in invertase activity in the 4.5-5.5 pH range, and (3) slower rate of liquefaction as ratio of cream center to cherry increases.

Processors Probe New Products

★ **NOVEL FATS . . . Up Candy Quality, Shelf-Life**

★ **CHERRY CORDIALS . . . Improved by Latest Techniques**

★ **MOLDED CANDIES . . . Ways and Means Evaluated**

Conclusion of Two-Part Article

FE STAFF

THE MAKING of higher-quality confections, through use of improved ingredients handled with latest techniques, drew top interest at the recent 10th annual conference of the Pennsylvania Manufacturing Confectioners' Assn. in Lancaster.

In addition to emphasizing advances in processing (detailed in Part I, "Processors Probe New Methods," FE June, p. 62), the conference accented the advantages of newer fats, control of liquefaction of cordial fruit cream centers, and late developments in the forming equipment employed for molded candies.

DEVELOPMENTS IN FATS

Recent processes for improved fats were cited by Melvin Ott, Durkee Famous Foods, Chicago. They included: Acetylation of mono- and diglycerides to form new acetyl glycerides . . . esterification of component fatty acids with glycerine . . . replacement of lower fatty-acid homologs of lauric-type oils with higher fatty acids . . . interesterification of fat blends to produce new and useful confectioner's fat:

Mr. Ott went on to discuss coating problems. Not only must seed be formed in the coating fat prior to enrobing, but it must assume a stable crystal form.

A seed crystal rapidly shocked out of a fat by quick cooling seems to emerge in the so-called alpha form—one with lowest melting point. As the alpha is not its most stable state, it soon changes to the higher-melting beta (or beta-prime) form.

A coating should not be enrobed, he continued, until the seed crystal, which has been removed from the tempering fat, has its highest melting point (more stable form).

Form of the seed crystal is important, because it determines the state of the balance of the fat crystals when the coating is finally set. If a seed crystal is predominantly beta-prime when the coating fat is set up, the other crystals forming on subsequent cooling will assume a beta-prime or highest-melting form. And the coating then will be almost indefinitely stable against bloom.

A thermal analyzer was used to run heating curves on fats and coatings. Here are some of the results:

Untempered, setup cocoa butter (rapidly chilled from melt to 30F.) starts melting at approximately 60F., and has completely melted at 84F. (indicated melting point). Therefore, no solids would exist at enrobing temperatures of 88F. or higher. The fat has set up in unstable forms (alpha, for the most part) with melting points of 84F. and lower.

Cocoa butter tempered by stirring in a thermostatically controlled bath for 24 hr. at 88F. showed little melting below 80F. Final melting point of a tempered sample was raised to 97F. Here, a large concentration of stable seed was present above tempering temperature, so fat was definitely in temper.

Untempered cocoa butter (chilled to 30F. and set at 73F. for 5 days) undergoes large polymorphic change during storage. It is indicated by an increase in melting point (from 84 to 97F). This change is associated with blooming of stored chocolate.

Thermal curves on untempered chocolate showed absence of higher-melting stable crystals and an 84F. melting point. There were no stable seed crystals (evidenced by melting point).

Chocolate tempered for 4 hr. started to form stable seeds, as indicated by a higher melting point. And a 24-hr. tempered chocolate (at 88F.) attained proper temper.

Centers enrobed with the latter were stored 2 weeks under cycling conditions from 60 to 85F., and then for 6 weeks at 73F. The coating showed excellent storage stability. Here, sufficient stable seed was set up to insure orientation of cocoa butter into its most stable form.

Untempered confectioner's hard butter (101F.) showed (by thermal analysis) little seed above tempering temperature (97F.). Indicated melting point on curve was 101F. By tempering this hard butter 6 hr. at 97F., more stable seed was formed. Here the melting point was 105F.

Hard butter tempered 24 hr. had maximum stable seed formation. Cooling this tempered fat in the presence of stable seed sets the whole coating in its most stable form. And dulling is avoided, since there is no polymorphic change.

Thermal data were obtained on a 101F.-type dark, sweet coating (tempered at 97F.) containing 33% added hard butter, 20% cocoa, 37% micro-atomized sugar, and ½% lecithin on coating basis. Tempering was carried out on a 3-lb. sample under slow agitation in a water bath controlled to 0.02F.

Untempered dark, sweet coating showed little melting above tempering temperature. Final melting point was 102F. The same sample tempered for 24 hr. had stable seed formation, as indicated by increase in melting point to 107F.

Before enrobing, it is recommended that a coating be agitated for 24 hr. at a temperature 4-5 deg. F. below the Wiley melting point of the fat.

NEWER FATS

Fats and oils can be processed, blended, modified, and reacted with one another in numerous combinations to produce desired products for confectioners, stated Peter Kalustian, E. F. Drew & Co., Inc., Boonton, N. J.

If a fat of improved keeping quality is desired, then an all-hydrogenated, all-purpose shortening (produced under selective conditions from choice vegetable oils) is recommended.

This type of shortening also extends shelf-life of nuts that are fried before being added to confections. And there is another "tailored" vegetable shortening with greater stability and higher smoke point than found in regular shortening or salad oil.

There is also a specially processed and modified coconut oil that has all the advantages of ordinary coconut oil—excellent flavor and odor stability due to high quality of its saturated components. In addition, it foams less and has a higher smoke point.

FDA-approved edible emulsifiers (monoglycerides) are available in shortening-type plastic form and as flakes. Both have a minimum of 40% monoglyceride content, and improve texture, smoothness, and compatibility.

Margarine is replacing dairy butter in confections. New and improved edible-fat formulations and techniques are being used to make bland, palatable margarines of long shelf-life.

Most ordinary margarines are made from common high iodine-value oils. New ones have a predominance of low-iodine-value fats, which result in palatable spreads with desirable melting characteristics and without the chewy aftertaste of ordinary margarines.

Also, they have exceptional shelf-life and do not develop off-tastes. Preservatives are unnecessary. Use of saturated glycerides, and oils of low iodine value and fatty composition, practically eliminates formation of peroxides and the resulting rancidity. Such a product available to confectioners is "New Process" bulk margarine (E. F. Drew Co., N. Y. C.).

As a lubricant in caramels and similar items, fully refined, deodorized coconut oil is one of the preferences of quality-conscious confectioners. Variations of this product are available for different formulations and needs, with melting points of 90, 100, and 110F. Their advantages are low iodine value and quicker melting.

For the past 20 yr., there has been tremendous commercial development and wide acceptance of hard butter. The Drew organization controls the special processing for making a tailor-made product. After initial vacuum fractionation and processing, it is refined, bleached, and hydrogenated to proper melting range for the desired hard butter. Following deodorization under high vacuum and temperature, product is packaged in 10-lb. slabs, or as a bulk liquid for large users.

An active program has been under way for several years to develop a hard butter from fats and oils other than lauric. And considerable progress has been made.

Small commercial samples, in both winter and summer melting ranges, are available for experimental purposes. This new type has notable merit, and so additional progress is seen imminent.

CHERRY CORDIALS

One of the most important steps in making cordial cream cherries is to control percentage of syrup remaining

(Turn to page 150)

REDUCTION of costs was quick when Seabrook introduced this trailer way of transporting shelled peas and limas in palleted drums. But it first took plenty of cut-and-try experimenting to solve drum-anchoring problem.

Cuts Costs, Speeds Job By Teaming Pallets and Flat-Beds

Seabrook sidetracks old lugs and switches to big drums that handily palletize in fours for safe, economical viner-to-plant transport of peas and lima beans

FE STAFF

COMPANY ENGINEERING of a special fully-palletized transportation procedure is paying high dividends at Seabrook Farms, Inc., Bridgeton, N. J.

►**The evidence has piled up over the last year—in terms of reduced cost of handling vined peas and lima beans and also in notable acceleration of operations.**

Formerly, most of the handling of these vegetables was in lug boxes. But now produce at the distant vining stations is loaded into 55-gal. drums, four of which make up a pallet load. Then pallets go onto flat-bed trailers for transportation to the plant, where unloading is entirely by fork-lifts.

Initial loading of the drums at the stations is simplified by use of conveyors. In the case of some very distant locations, however, loaded drums are wheeled into place with hand trucks.

Such drum handling of vegetables is not entirely new. But Seabrook has improved it, not only by power-trucking palletized drums but also by employing the 32-ft.-long flat-bed trailers that have no sides or ends.

Thereby, trailer loading and unloading time has been reduced from the 2-hr.-plus needed by conventional methods down to 15-20 min. by the new procedure.

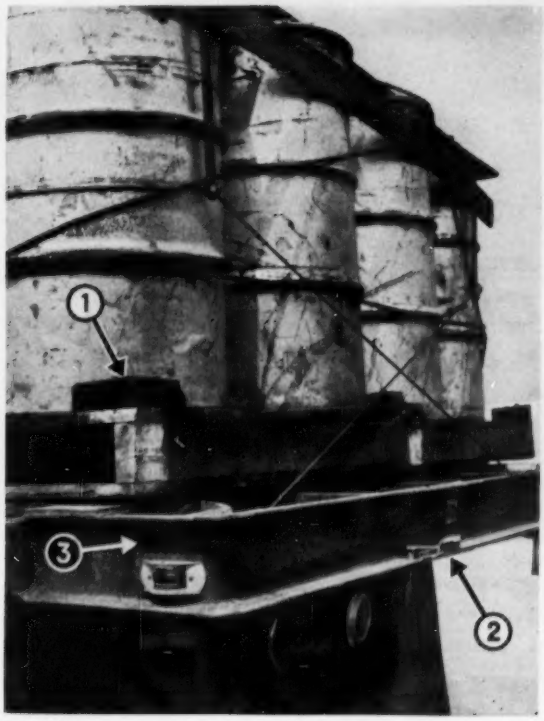
5 Advantages

Though some of the savings made by this shift have been minor, the aggregate of all savings has been large. Reduced were—

1. **First cost of containers**
2. **Container sanitizing, repair, and replacement costs**
3. **Transportation expense between viners and plant**
4. **Loading and unloading time**
5. **Labor required for loading and unloading**

These gains weren't accomplished *presto* in one swoop. Rather, the required changeovers were engineered one by one.

There were difficulties to be overcome—the initial one being the fact that the drums, particularly empty ones, tended to slide off the pallets. But this sliding ended after triangle chocks (cut from 2x4's) were attached at the corners of the pallets and between the drums. These



DRUMS are prevented from sliding by triangle wood chocks (1). Crank (2) for winch-tensioning of holding cables is seen secured on "false bumper" (3).

STEEL "EYE" ANCHORS (as at arrow) hook over drums to hold up cable.

UNDER VIEW of false bumper shows how cable-winch (arrow) sets inside.

chocks don't interfere with loading pallets with drums or unloading them.

Next came the problem of preventing the pallets themselves from sliding sidewise or outward on the trailer bed. However, securing of 1x2-in. stripping to the bed, throughout its length, served to anchor the pallets. The strips are so located on each side as to fit into the openings between the bottom slats of the pallets.

Greatest difficulty to surmount was tipping of the drums enroute, with the risk of their bouncing from the trailers. Here, again, empties proved harder to keep aboard than the filled drums.

Ruled out from the start were full length removable sides and ends—since the prime aim was to find other means. This effort to come up with a simpler way hinged not only on savings in initial investment but also on saving of the time and labor that would be required to position and secure such removable panels.

Accordingly, several drum-securing methods were developed, and each underwent rigorous tests. A large parking area and adjacent roads and entrances provided the proving ground—with bumps and humps included in the hazards.

This proving area was ample for safe execution of turns and speeds beyond those to be expected in normal road operation.

Cables Prove Answer

In the end it was determined that holding of the drums on the trailer beds with steel-wire cables was both fast and efficient. However, when cables were rigged conventionally around the drums, the tension tended toward bunching them circlewise—with the result that drums were forced overboard near the middle of the trailer bed.

Anchoring the drums on the four rear pallets proved to be the most important step in overcoming this hurdle. Three forms were constructed, each made of 1x4-in. oak timbers attached to metal straps, the latter bent at right angles.

Secured in place, these forms exert pressure on tops and sides of the 16 drums on the rear of the truck, compacting them as one unit.

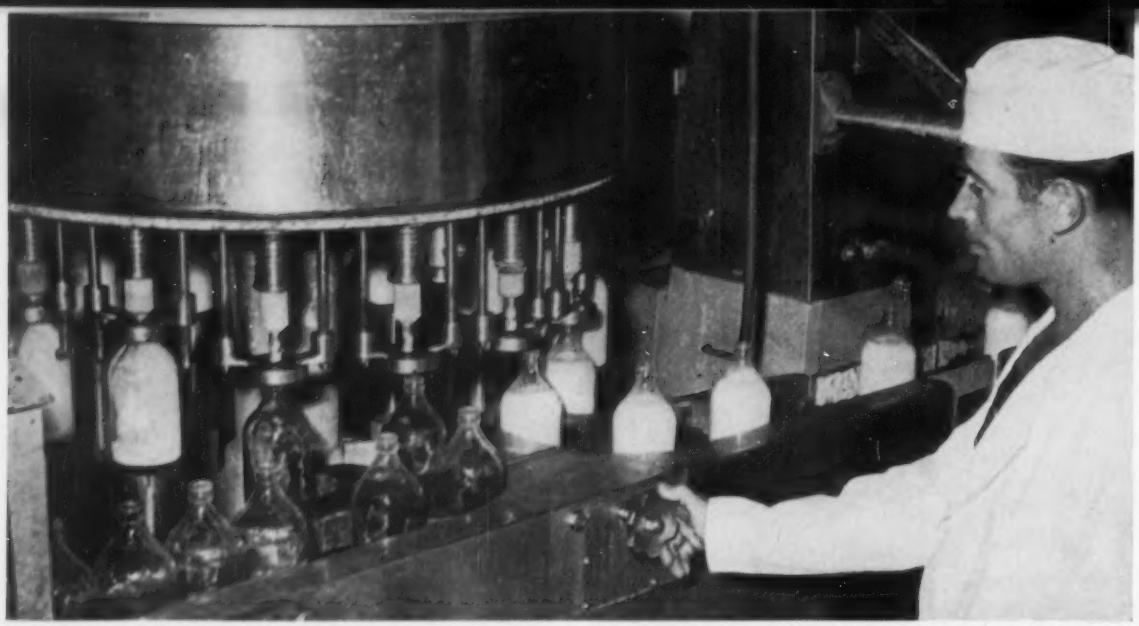
Tension in the steel cables, which extend along the sides of the drums from front to rear, is obtained by means of hand-cranked winches. These are located at the rear of each trailer inside a "false bumper" made of 8-in. channel iron welded onto the rear of the bed. Each winch can draw its cable up to a tension of 1,500 lb.

To insure against loss of the winch-crank, and also to be certain that it is always handy at the point of need, a special crank holder was fabricated on the false bumper. The handle part of the crank slips through a hole bored in the lower lip of the channel-iron frame, and the crank in then held securely in place by a strap of metal welded upright to the outer edge of the channel adjacent to the hole for the crank handle.

Position of the cable along the side of the drums throughout the length of the trailer is maintained by means of eye-ended metal straps that hook over the tops of the drums. By means of these, the cable is elevated to the right height and is prevented from falling below the center mark of the drums.

Additional advantage in handling, plus a saving in cost of operations, could be gained if, instead of using the drums, larger containers similar to galvanized farm watering troughs were employed (see Practical Ideas, FE May '54, p. 7).

In Seabrook's operation, however, capital investment for such bigger containers would run higher, since the company's 55-gal. drums are those in which shortening was originally shipped for use in preparation of frozen French fried potatoes. Recoverable value of these drums is low—approximately $2 each.



CROWN-CAPPED BOTTLES are filled on vacuum-type machine. The completely-sterilized milk product keeps indefinitely without refrigeration—prime advantage in countries where cold storage is scarce.

New Equipment, Better QC Spark—

Gains for Sterilized Milk

Promoted by UNICEF, the bacteria-free product is enjoying a booming popularity in foreign lands. Here's how latest techniques and units are employed in Israel to produce a milk that stores without refrigeration

HILLEL SHUVAL
McGraw-Hill World News, Jerusalem

SAFE CONSUMER STORAGE of perishable foods is well-nigh impossible in the desert-like temperatures of Israel because of the general lack of home refrigeration,

This explains the spectacular success of a new food product—fully-sterilized milk—which is being turned out in the modern plant of Tenne-Noga Dairy, at Kfar Shmariyahu near Tel Aviv.

Introduced in Israel by the United Nations International Children's Emergency Fund (UNICEF), which partly financed the dairy's equipment, this product is rapidly replacing old-style bulk milk distribution.

Admittedly, the rigorous heat process employed to kill all bacteria (even spore formers) does produce some off-flavors and colors, and changes consistency of the product.

But Israeli housewives have always boiled bulk-purchased milk for safety. And so, the slightly cooked taste of the new milk is little different from that to which they are accustomed. And the convenience of having a bottled product that can be stored for indefinite periods without refrigeration is immeasurable.

Further, new processing techniques and equipment that are now in use at Tenne-Noga, have markedly improved product quality. And continued research on factors affecting flavor and texture promise an even greater future.

Big Problem—Raw Milk

Tenne-Noga is situated in the hinterlands, and receives its milk from 30 private farmers and cooperative producing settlements in the local area. Shipping distances are short. Still raw milk quality is definitely a problem.

Off-flavors from improper feeding of the cows are accentuated in the sterilized product. Spore formers, particularly *B. subtilis*, enter raw material during milking, and are a serious problem at the plant.

These two situations can be properly corrected only by sound barn sanitation, adequate cooling, and improved transportation.

Vacuum deaeration at high temperatures can be helpful in removing off-flavors. But for milk containing a high count of spore-formers, the only remedy is higher processing times and temperatures.

This is to be avoided, naturally, since it leads to caramelization of lactose, protein breakdown, and reduced vitamin content.

All suspected milk is tested with alcohol on arrival at the plant. Milk coagulating when 1 ml. of 68% alcohol is added to 1 ml. of milk is rejected. No bacterial counts are made now, but it is planned to introduce the methylene blue reduction test soon. This will place a premium on high quality milk and penalize the

(Turn to page 75)

Polyethylene "girdle" improves display of 6-can beverage pack!

Sale of multiple unit is doubled and tripled—handling is easier, too!

Six 12-ounce cans of any beverage can now be packaged in a transparent showcase that displays the familiar label on every can!

A band of polyethylene film holds the cans snugly together—and takes colorful imprinting that promotes the unit.

600 cans a minute are packaged in this manner. A flat roll of imprinted polyethylene film is continuously made into a tube and cut into bands. Bands are then automatically stretched about ¾-inch and slipped over the cans.

Polyethylene film retains its tension on the cans through changing weather conditions and under refrigeration.

Besides improving display, the "Show-Pak"* unit is lighter in weight than conventional cartons and requires less storage space. It comes complete with retractable handle.

It's a striking example of the great new possibilities for profitable packaging that polyethylene now makes possible. Monsanto will be glad to put you in touch with packaging specialists who will work with you on your own requirements. *Write Monsanto Chemical Company, Plastics Division, Room 1167, Springfield 2, Massachusetts.*

MONSANTO *Polyethylene*

MONSANTO

Monsanto also supplies styrene and cellulose acetate for packaging.

*PATENT NO. 2667995 IN U. S. PAT. OFF.
BY THE BERADA CORPORATION, SAN MARINO, CALIF.

Model "L" (350 lb.) provides complete truck cooling for over-the-road operation.

cargoes stay cool automatically ...with COLDMOBILE

Model "LE" (550 lb.) adds a convenient plug-in for electric stand-by operation. A split "LE" (600 lb.) is available for trucks of low body height.

This driver can forget about his cargo—for this Coldmobile truck-cooling system takes care of itself... maintains ideal truck temperatures even after many door openings. Now meats, poultry, dairy products—in fact, any perishables—*stay* fresh, completely protected at the proper temperature, all the time.

Coldmobile cuts costs! First cost is low...operating cost is low. Powered by the truck engine, Coldmobile eliminates the need for special batteries or an auxiliary motor. Yet there is no noticeable drag in truck performance or change in fuel consumption.

Defrosting is automatic! There are no special controls for the driver to constantly watch and adjust. Even oiling and greasing are unnecessary since all units are factory sealed, and all moving parts have their own sealed-in lubrication.

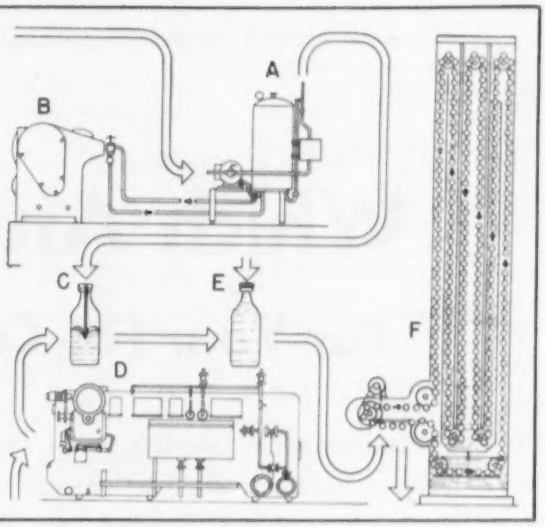
For complete information, write:

UNARCO

COLDMOBILE DIVISION
UNION ASBESTOS & RUBBER COMPANY
2900 West Vermont Street, Blue Island, Illinois

Of top interest in process . . .

. . . is new vertical sterilizer (right). To reach this unit, milk is pre-sterilized (A) and homogenized (B). Clean bottles are fed to filler (C) from washer (D). After capping (E), full bottles pass into vertical sterilizer (F). Here, first and third legs of unit are partly filled with water to maintain steam pressure in central cooking chamber. Bottles are pre-heated in first section, then sterilized for 10 min. at 237F. in center. Cooling is accomplished by passing bottles through third-section water leg, then spraying them with cold water.



raw material that falls to low standards of sanitation.

After milk has been weighed, it is clarified, partially separated, and pasteurized at 162F. for 15 sec. in a HTST plate pasteurizer (Alfa Laval). Next, milk is cooled rapidly to 40F. and stored in insulated holding tanks, where it is standardized to 2.6% butterfat (statutory requirement in Israel).

The pre-pasteurization is not essential for sterilization. But since Tenne-Noga produces other dairy items, all incoming milk is so treated. Milk to be sterilized is then withdrawn, as needed, from the holding tanks.

First Sterilizing Step

Milk flows from tanks to the regenerative section of the tubular-flow pre-sterilizer (Stork & Co., Amsterdam). Here, it is heated to 160F. The heating medium is sterilized milk from the second heating stage.

Next, the hot fluid is homogenized at 2,600 psi. Milk then returns to the pre-sterilizer and is flash-heated to 275F. Then it is cooled in the regenerative section of the unit to about 155F. before bottling.

Milk is filled into narrow-necked bottles (600g. capacity) on a vacuum-type bottling machine. Bottles are sealed with aluminum-lined crown caps.

It should be noted here that the "pre-sterilization" step completely sterilizes the milk. And if it were possible to fill the milk aseptically, further heating could be omitted.

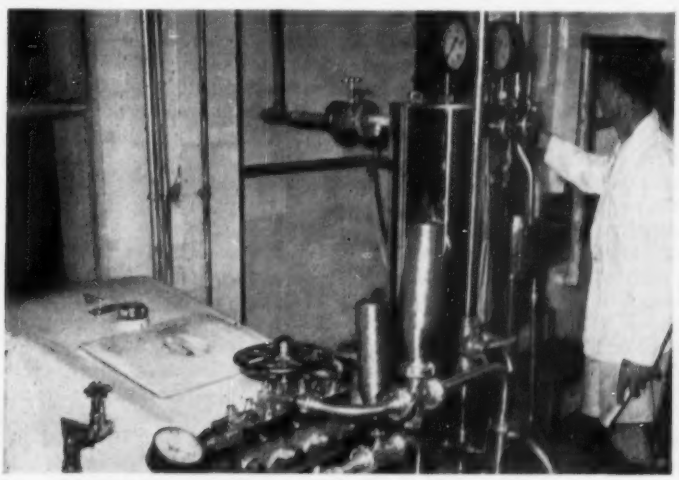
In fact, processes and equipment are now being developed to make this ideal possible. And it is claimed that these techniques, when ready, will hold flavor changes in the milk to a bare minimum.

At present, however, further heat treatment is necessary. Thus, bottled milk is conveyed to a unique, continuous sterilization tower (Stork).

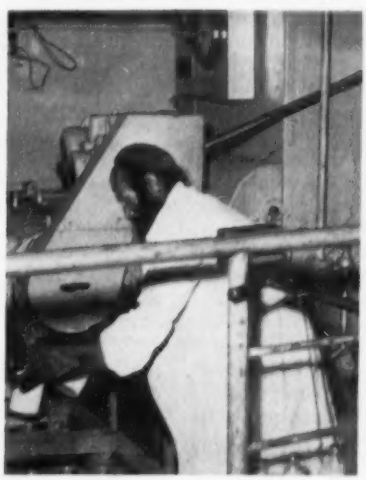
This recently-developed unit is 42 ft. high, and is divided into three main sections. The first and third sections are further partitioned into two parts each (see diagram). An endless chain winds up and down through the various compartments, while sleeve-like metal attachments hold the bottles in a horizontal position. Passage time through each section is 17 min., a total of 51 min. for the whole unit.

The central section of the tower is

(*Turn to page 179*)



HOMOGENIZER AND PRE-STERILIZER prepare milk for bottling. Homogenizer has 3-piston pump. Stainless, bottle-shaped air-cushioning units (center) even-out the flow between the two units.



AT BOTTOM of vertical sterilizer, Israeli worker cases finished product. Note control panel (top center).

Which Antioxidants?

For Your Fat-Containing Foods

Protection such products will give you depends on careful choices and proper uses—for their actions are highly specific . . . Here are pointers on which combinations work best. Also mechanisms of fat breakdown and the agent's performance . . . Test methods detailed

B. N. STUCKEY

Research Division, Eastman Chemical Products, Inc., Kingsport, Tenn.

THERE ARE MANY fat-soluble antioxidants with which the meat packer, the baker, the confectioner—and many other processors—can extend the shelf-life of foods.

But exactly which ones, or which combinations, will best safeguard a given product? And how are they most effectively employed?

Practical applications of these versatile agents, and their reaction mechanisms, will be cited. But first, a distinction should be drawn between true antioxidants and synergists or metal deactivators.

In most cases, true antioxidants are phenolic in nature, but may be derived from natural or synthetic sources. In contrast, synergists or metal deactivators are normally acids or salts of ascorbic, citric, tartaric, or phosphoric acid.

Antioxidants approved for food use in this country include gum guaiac, nordihydroguaiauretic acid (NDGA), various tocopherols, lecithin, propyl gallate, butylated hydroxyanisole (BHA), and butylated hydroxytoluene (BHT). In addition, citric and thiodipropionic acids are approved for use in animal fats, both alone and in combination with the above phenolic compounds.

Other antioxidants have also been tried, although none is yet food approved.

The higher gallates (ethyl, octyl, and in some cases, dodecyl) are permitted in Europe, being used quite extensively in some of the North Sea countries. But in the U.S. the most important antioxidants for fats and oils are BHA, BHT, and propyl gallate. Most commercial formulations contain one or more of these phenolics, plus a synergist or metal deactivator to enhance their antioxidant properties. NDGA is used extensively in some foods, but not widely in fats and oils because of economic factors.

These materials usually are marketed and used in two forms—as liquid solutions of basic antioxidants because of better solubility in fats, and as solid formulations of pure antioxidants or blends, where solubility is not a great problem.

► **Animal-fat rendering** entails the greatest use of antioxidants today. Most packers find that various combinations of BHA and propyl gallate serve their needs adequately.

For special applications, particularly fats for shortening manufacture or to be used in bakery products, mixtures of BHA and BHT prove effective by offering additive carry-through properties in the finished baked goods.

► **In vegetable oils,** compounds of propyl gallate and citric acid are useful, provided carry-through stability is not required. Where it is needed, formulations based on BHA, BHT, propyl gallate, and citric acid, and those of BHA and propyl gallate with citric acid, are being employed successfully.

A special note at this point: Most complaints arising from the use of antioxidants in fats and oils are due to inadequate mixing of the antioxidants into the fat.

Much of the discoloration normally attributed to propyl gallate can be corrected by properly blending this agent into the animal or vegetable fat. Under certain conditions, water contacting the fat will leach propyl gallate and cause discoloration due to iron.

► **Dry cereals** are advantageously treated with an antioxidant spray consisting of BHA or BHA and propyl gallate. It is applied directly onto the dried product after cooking.

Work on uncooked cereals, such as rice brans, indicates that the spray technique is a practical means of inhibiting rancidity under commercial conditions.

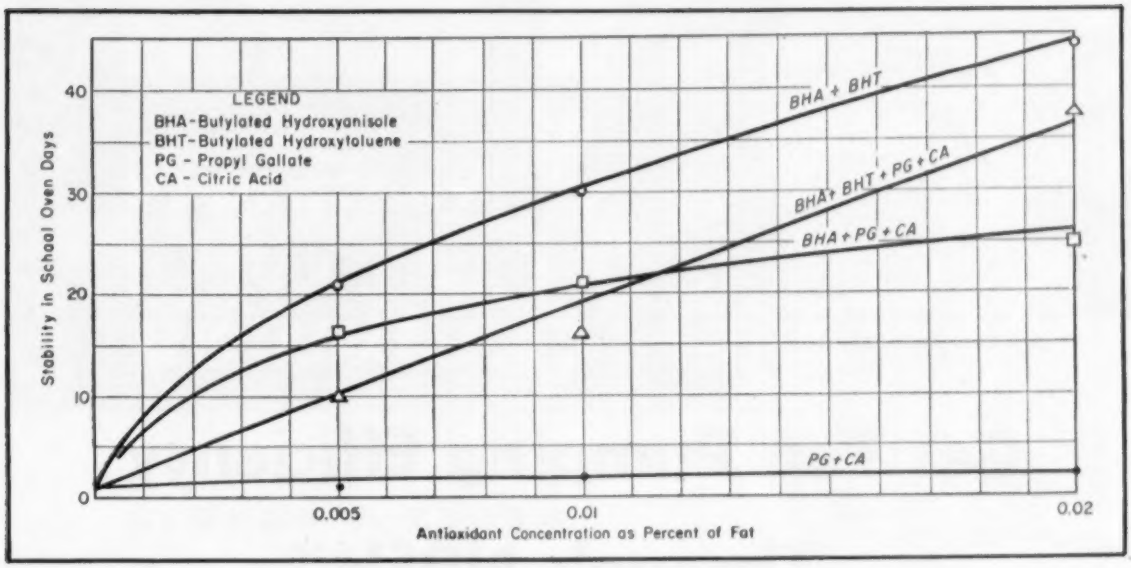
► **In essential oils and vitamins,** tests show that in many cases the pure antioxidant stabilizes products equally as well as, if not better than, the combinations. However with vitamin A, excellent stability results with use of a mixture of BHA, BHT, and propyl gallate.

► **Nuts and confections,** treated with BHA and BHT (also BHA and propyl gallate) show good resistance to rancidity. Where the nuts are to be sprayed, combinations of BHA and BHT are favored because of their extreme solubility in vegetable oil and ease of handling. Propyl gallate tends to discolor in contact with metal spray equipment, hence is not recommended for this application.

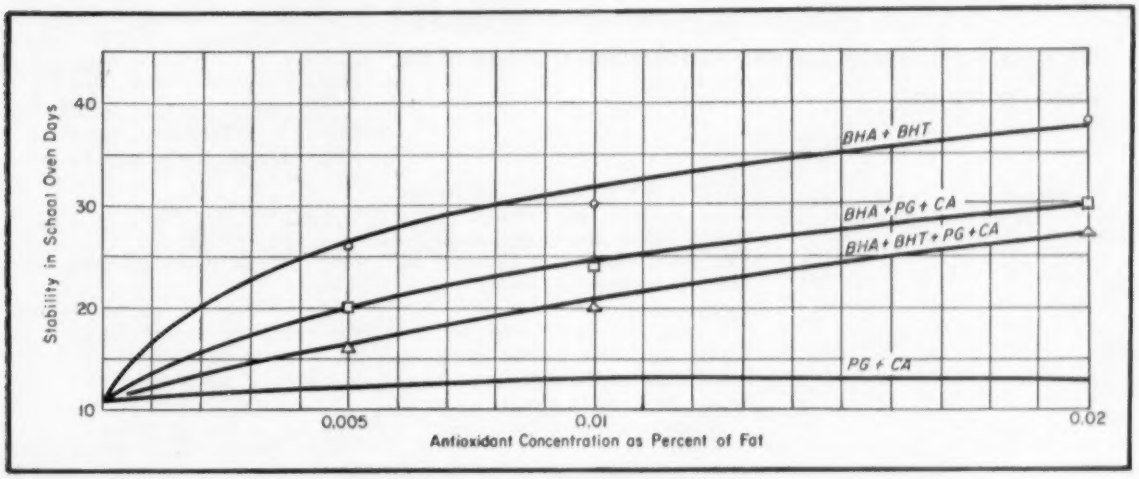
Large quantities of antioxidants go into the paraffin field to stabilize waxes used on food packages. Best results are obtained with BHA and BHT because they can be handled in pure form since no solubility problem is involved. Antioxidants are also applied directly to the food package,

(Turn to page 198)

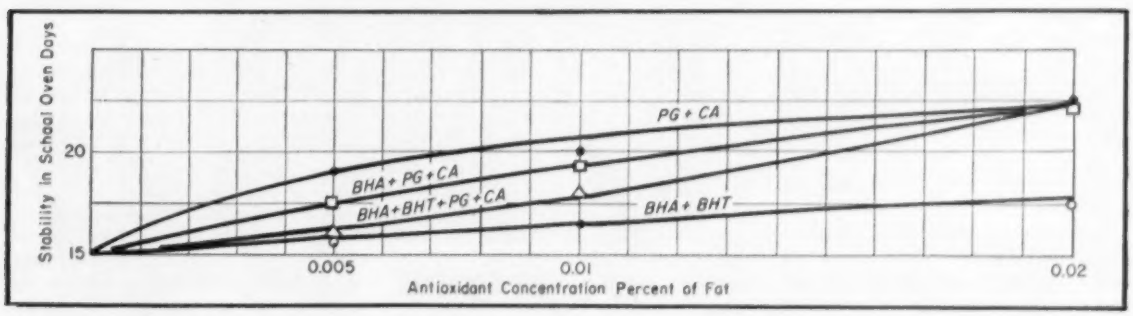
Some Antioxidant Mixtures Up Shelf-Life More Than Others—



. . . In Pastry Made With Lard

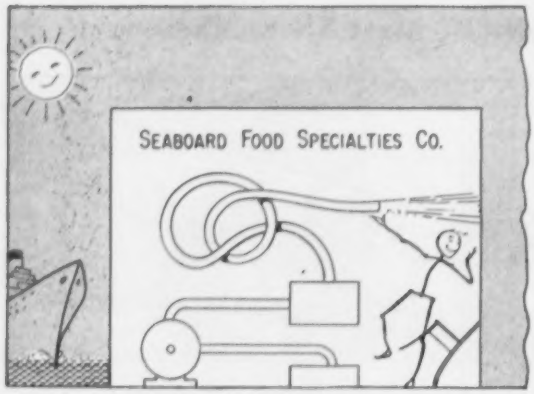


. . . In Crackers Prepared With Lard

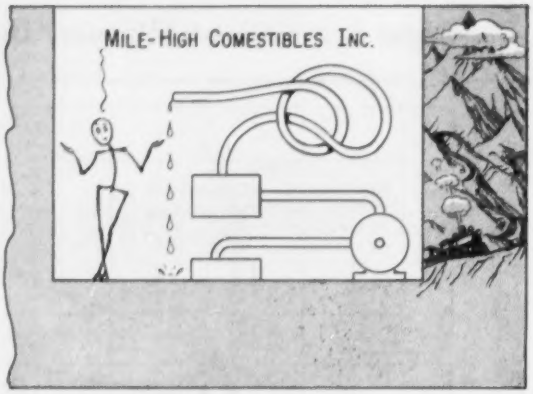


. . . In Potato Chips Fried in Corn Oil

YOUR SELECTION depends on the particular fat or oil being protected, as shown by these graphs. Generally, combinations of basic agents make best all-around antioxidants, effectiveness usually increasing with concentration. Synergists or metal scavengers are included to inactivate trace metals that act as pro-oxidants.



Same Equipment: But results . . .



. . . differ

Get Top Pumping Efficiency Through NPSH*

***Net Positive Suction Head—which you determine by calculating three fundamental factors. And this makes choice of the proper pump easy**

J. A. CABLE
Application Engineer, Norwood Works, Allis-Chalmers Mfg. Co., Milwaukee

AS MANY A PROCESSOR has sadly found, getting required efficiency in pumping of water, or other liquids, through plant lines can be quite tricky.

The fundamentals of suction values enter the question. Actually, there are two kinds of net positive suction heads (NPSH)—(1) that *available* (in respect to your given conditions), and (2) that *required* by a particular pump.

By proper weighing of these two conditions, any solvable problem of liquid movement can be met by installation of the proper centrifugal pump.

All you have to do is to make sure there are enough feet of NPSH to go around and satisfy the following factors:

A. The lower atmospheric pressure, if your installation is much above sea level. (Whereas air pressure at sea level "serves a helping" of 34 ft. of NPSH, this can be considerably lower at altitude.)

B. Vapor pressure of product at pumping temperature.

C. Lift and friction in suction line. (Add to the suction lift all friction losses in pipe and fittings. This should include the drop through the foot valve, which is a necessary adjunct to centrifugal pumps on lift applications.)

At this stage in your figuring, you tell the prospective supplier how much is left (available NPSH), and then all he has to do is to give you a pump that requires less than that amount.

To Give on Example—

Let's say that a food plant near Flagstaff, Ariz., wants to pump 180F. water from an open, heated tank that stands 2 ft. above the pump installation point.

This involves Factor A (above), since Flagstaff is about 7,000 ft. above sea level. Here, the atmospheric pressure is 3½ lb., or 8 ft. less than at sea level. Accordingly, we start with 34 — 8 = 26 ft.

Attending now to Factor B, tables and curves (readily available) tell us that the vapor pressure of 180F. water is approximately 7½ lb., or 17 ft. So deducting 17 from 26 we have a balance of 9 ft.

Then to Factor C: In this example we have 2 ft. positive head on the suction. But this must be modified to compensate for frictional losses in the pipe—assumed to be 1 ft.—so we have 9 + (2 — 1) = 10 ft. available NPSH.

Thus, the pump must require less than 10 ft. NPSH to do the job.

Here is a handy formula for computing NPSH:

$$NPSH = \frac{2.31\,(P_a - P_v)}{Sp.\ Gr.} + H_e - H_f$$

where (at maximum pumping temperatures):

P_a = atmospheric pressure in psia. This is 14.7 lb., or 34 ft., at sea level, but it comes down about 1.1 ft. for each 1,000 ft. above sea level.

P_v = Vapor pressure in psia.

Sp. Gr. = Specific gravity.

H_e = Elevation head. When water level is above pump, this is a plus figure, where it must be lifted to pump, it is a minus.

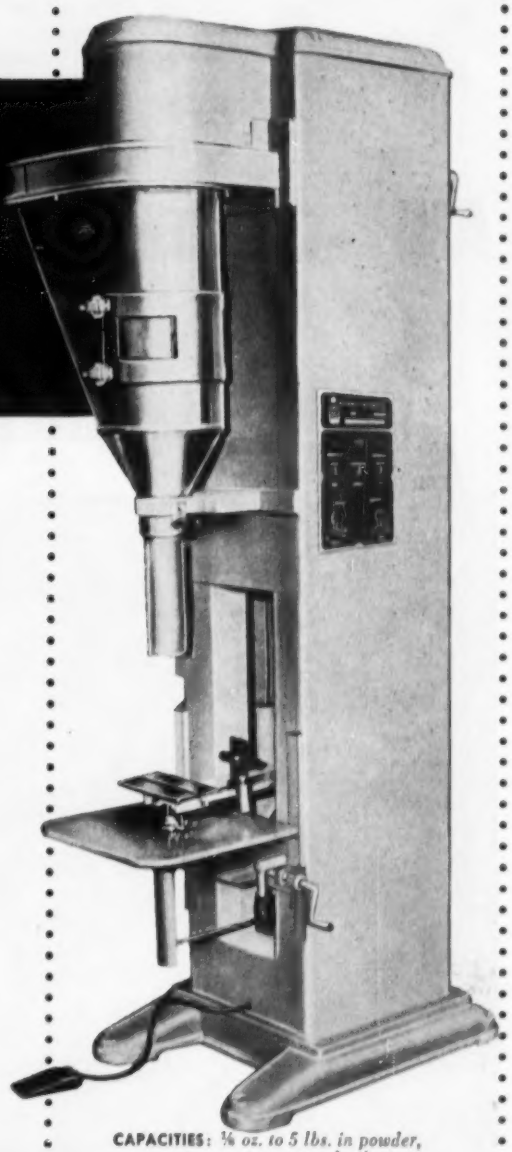
H_f = Friction head or friction loss in suction piping.

If your suction tank is enclosed, such as a vacuum vessel or evaporator, you usually have the liquid boiling at its surface. In this case $P_a = P_v$, and the first part of our formula becomes 0. Available NPSH then equals $H_e - H_f$.

This discussion accents the importance of getting the correct data—which you can employ in figuring your own available NPSH, or furnish to your supplier so that he can do so.

Of course, if you are only concerned with pumping water out of an open tank at sea level and at a temperature less than 85F., you can think in terms of suction lift and let it go at that.

Exceptionally Versatile!



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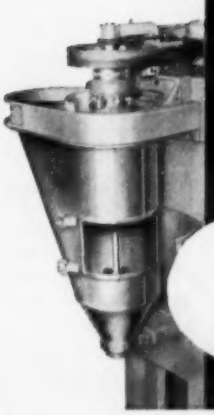
- *pressure packing*
- *gross weighing or*
- *combination auger-vacuum of cans, jars, boxes, bags, etc.*

Packaging costs take a sharp drop when you put the Universal EG Filler in your production line. Auger speed is adjustable from 500 to 1000 RPM, with the filling cycle pre-timed to pace the operator from 15 to 30 units per minute. Micrometer adjustment assures accurate fill. Will accommodate a wide range of package sizes.

CAPACITIES: *¼ oz. to 5 lbs. in powder, paste or granular form.*



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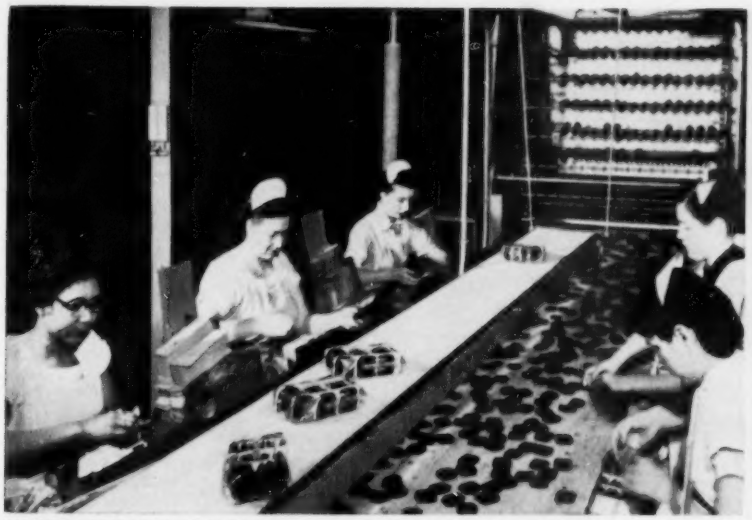
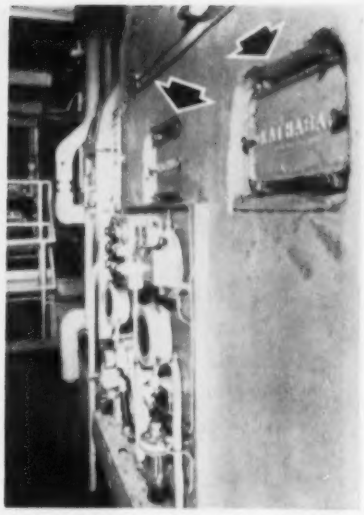


CHOCOLATE-COATED BISCUITS, seen discharging by belt conveyor from one of N.B.C.'s huge humidity-controlled trolley-type dipping and drying machines (top right), are ready for immediate packaging. Precise control of atmosphere in combined unit is afforded by . . .



. . . **THESE HUMIDITY CONDITIONERS** (arrows), two of three that keep drying air at 35% R.H., 85F.—best for setting the icing.

Special Dehumidifying Setup Boosts Coated-Product Output

National Biscuit does it with chemical-type units designed into two trolley-type dipper-dryers, each handling 5,000 lb. of iced items per 8-hr. shift. Furthermore, moisture absorbing solution employed has notable bactericidal qualities

D. M. VALENTINE
Engineer, Surface Combustion Corp., Toledo, Ohio

MASS PRODUCTION of coated biscuits and cookies at National Biscuit Co.'s Kedzie Bakery in Chicago is now being sped by chemical-type humidity conditioning.

The conditioning equipment has been made an integral part of a pair of huge combination trolley-type dipping and drying machines.

▶ Designed and built by company engineers, the units give products the required number and type of icings, then deliver the items cooled and ready for packing.

In fact, the packing is practically an incorporated activity, since the operators take the biscuits directly off the belt discharging them from the dipping and drying machines and put them into bags or boxes.

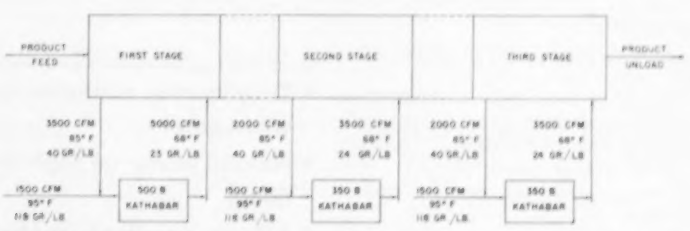
In short, the packages are on their way to the shipping department as fast as the contents are produced.

▶ The dehumidifiers, themselves, can be similarly applied in the confectionery field, and have been used in drying of gelatin (FE Aug. '55, p. 60).

Further applications include atmosphere control in yeast rooms and fermentation cellars, drying of yeast, and drying and packaging of sugar-coated cereals and instant coffee.

To get back to N.B.C.'s installation—

(*Turn to page 185*)


PRODUCT FEED
FIRST STAGE
SECOND STAGE
THIRD STAGE
PRODUCT UNLOAD
3500 CFM 85° F 40 GR/LB
5000 CFM 68° F 25 GR/LB
2000 CFM 85° F 40 GR/LB
3500 CFM 68° F 24 GR/LB
2000 CFM 85° F 40 GR/LB
3500 CFM 68° F 24 GR/LB
1500 CFM 95° F 118 GR/LB
500 lb KATHABAR
1500 CFM 95° F 118 GR/LB
350 lb KATHABAR
1500 CFM 95° F 118 GR/LB
350 lb KATHABAR

FLOW DIAGRAM shows distribution of outside and recirculated air dehumidified for the three air-conditioning stages of one dipper-dryer.

TO CUT handling costs of returnable containers, Dannon tried them for its yogurt—now uses them 100%. Note automated filling-capping operation in company's Long Island City, N. Y., plant.

Round, Nesting, Paper Containers

Offer You Many Food-Packaging Values

FARLEY MANNING

Director, Field Research Division, Paper Cup & Container Institute, Inc., New York City

HOW SHOULD a food processor properly evaluate a container to be used for packaging his food?

► **His criteria must be: (1) Protection, (2) convenience and adaptability for high-speed operations, (3) a cost he can afford, and (4) the degree to which the package lends itself to merchandising.**

In the specific case of round, nesting paper containers, there's strong evidence of their high satisfaction on the score of these four criteria—for a major portion of the country's production of cottage cheese, whipped butter, sour cream, and yogurt is packed in them.

In addition, a tremendous variety of both frozen and non-frozen specialty products go into these containers, some of which serve as standard packaging and some being employed for short-term carry-out. Certain of these products require refrigerated storage; others can be kept at room temperature.

Construction Turns the Trick

Body stock of these containers is generally of white sulfate or sulfite paper or paperboard, sized with a maximum of rosin to give highest possible water resistance. Further, the stock is sufficiently bright to display printing to advantage and at the same time be consistent with required strength. It is calendered (passed between heated rollers at high pressures) to make it both sturdy and impenetrable.

- **They store in minimum space when empty**
- **Handle easily on high-speed fillers**
- **Afford excellent protection for products**

These containers are either of light or heavy-duty type. Most light-duty containers, such as may be recommended for ice cream and sherbets, are of two-piece single-wrapped construction. They are wound once into a tapered cylinder, and glued at a side seam. Then the lower end is turned up about a bottom, and held in place with an adhesive. Finally, the upper end is turned down about itself on the inside or outside to make a finished flat or rolled edge.

Other light-duty containers are of one-piece construction, pleated from

WIDE, open tops and rigid construction enable filling without adapters, funnels, holders, or shapers.

RAPID, simple changeovers permit using containers of different capacities and sizes on same fillers

top to bottom with a tightly folded or rolled rim.

Stock thickness ranges from 0.007 to 0.010-in.

Heavy-duty containers are of two-piece construction, but may be either single- or double-wrapped. In the latter, the paperboard is wound twice about itself with a continuous film of adhesive forming a barrier between the two thicknesses.

Bodystock here is usually 0.0075 to 0.020-in. thick, depending on size, specific construction, and use for which container is intended.

The single-wrapped type is made of the heavier stock which, through variations in treatment or coating, becomes as satisfactory for many purposes as the double-wrapped.

The containers have other built-in characteristics. They may be dry-waxed, wet-waxed, or plastic coated. Those used for freezing foods, for example, are double-wrapped, or heavy-duty single-wrapped with a barrier of wax, synthetic plastic, or other suitable coating.

Both wax and plastic reduce vapor and odor transmission to the point where frozen or simple refrigerated foods can be kept for the maximum length of time recommended for the food itself.

Moreover, such barriers also keep other refrigerator odors from tainting such products as cottage cheese and butter.

Special lactic acid-resistant waxes are used for cottage cheese, sour cream, and yogurt packages, and some have plastic additives. Higher melting point waxes are used for packing foods under high-temperature conditions. Wax melting points range from 135 to 150F.

Body Styles, Sizes; Lid Types

The round, nesting paper containers come in three different body styles: Squat, tall, and intermediate.

Light-duty types are available from capacities of 3 through 16 oz. (liquid). They are packed 50 or 100 to the dispensing tube, 1,000 or 2,500 to a shipping case.

Heavy-duty container capacities range from 3 to 170 oz. For smaller sizes, packings are 25 or 50 to a tube, 250, 500, 1,000, or 2,000 to a case. Sizes over 32 oz. are packed 100, 250, or 500 to a case.

Many types of lids are available in different materials for various food products. In design and construction, they fall into three major classifications: Snap-in, snap-over, and cover-all.

Snap-in lids are flat, rigid, treated paperboard disks that are inserted in suitable grooves or lid seats. Some have an integral pull-out tab, others have a tab stapled to them, and many have a window for product visibility.

Snap-over or slip-over closures completely cover the outer rims of the containers and grip them mechanically or through friction. These lids, too, may be obtained with windows.

Coverall closures also cover the outer rims of containers, but project

DUE to Their Taper, Round, Nesting Paper Containers Require Only Minimum Storage Space

Container Size (oz.)	Number In Case	Space Per Case (Cu. Ft.)	Cases In Box Car
8	1,000	5½	690
12	500	3¼	1,138
16	500	4	950
32	500	5	760

down inside to the lid seats. They may be made of treated paperboard, metal, or clear plastic.

All lids have high resistance to vapor and odor transmission and, when used in combination with properly selected containers, provide complete packages with very satisfactory characteristics.

Protective Features

According to Barail,* "Paper containers have very low bacterial counts when manufactured. This applies to containers for milk, cream, ice cream, salads, and frozen foods, also to cups used for drinking water or other beverages. Therefore, they do not need any special protection during packaging operations except storage under sanitary conditions."

The following protective features are offered by the round, nesting paper containers:

1. They do not introduce microorganisms into food. (In addition, they need not be cleaned before use.)
2. Selected coatings of wax or plastic have excellent resistance to food acids and alkalis, and to grease.
3. They are good insulators and so will protect food against variations in temperature.
4. With heavy-duty wax or plastic coatings, they have excellent resistance to transmission of moisture vapor and odors.
5. They provide protection against chemical reactions catalyzed by light.
6. Their resistance to puncture, bursting, and abrasion are high.

Efficiency in Processing

Large, highly-mechanized producers will be particularly interested in the following convenience factors:

1. Since the containers taper and have uniform dimensions, they can be nested when empty, permitting storage of a large number in a small space (see accompanying table).
2. They lend themselves to high-speed filling. However, temperature of the food should be no higher than that recommended by the manufacturer based on the wax used for coating. Uncoated or plastic-coated containers may be filled at much higher temperature—some products being successfully packaged in them at up to 200 deg. F.

Automatic filling machines handle these containers at their maximum rated capacities, including capping, and coding when desired. Filling speeds depend, however, on size of container and product being packaged.

3. Less labor is needed for the filling and capping operations. Since they come nested, a full tube of containers can be put on the machine at one time. Similarly, most of the closures are nested, permitting continuous production. Container and closure holders are built into the machine.
4. Filling is facilitated by the wide-open tops, rigidity, and non-tipping features. This is true even for smaller-volume production. The containers can be filled by almost any kind of equipment without adapters, funnels, holders, or shapers. They're especially adapted to filling of liquid or semi-liquid prepared foods, with or without chunks of solids, since they're tall in relation to the volume of food they hold, and thus minimize the waste of sloshing and splashing in filling.
5. For most foods, no further operation is necessary after capping, except packing for shipment. Labeling, overwraps, tying or sealing, or special tags are not required.
6. Rapid and simple changeovers permit the use of a variety of packing capacities on the same machines. Amounts fed by the machines are easily adjusted, as are capping heights and lid and container holders.

Still Other Advantages

Cost factors must, of necessity, enter the picture in a large-volume, low unit-profit operation. In addition, the cost-conscious housewives prefer to pay less for packaging so as to get the fullest measure of food for their money.

Heavy-duty wax- or plastic-coated paper containers are the lowest-cost packages for frozen or other foods that can be decorated and printed in color, and that will fully protect food.

They lend themselves to mechandising a single specialty item or a whole family of prepared foods under one brand. Their manufacturers maintain art staffs for custom design of a package or family of packages, including containers and caps. All such containers can be printed in brilliant colors, to order. Closures of all types can be printed to match.

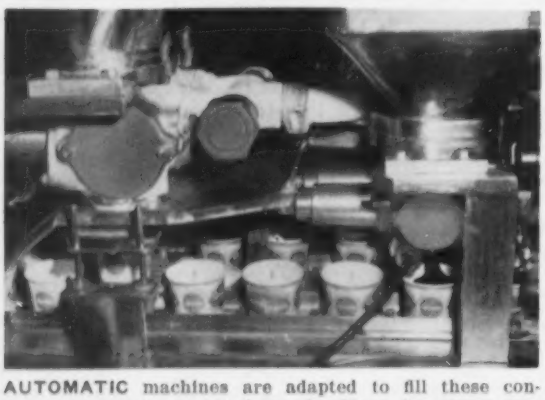
The size range, itself, is worthy of special mention. One of the best markets for some foods is the person living alone who is reluctant to cook a complete meal for himself, but who would rather eat at home than in a restaurant.

Single portions of cooked foods can be packed for refrigerator or freezer storage in the round, nesting paper containers in sizes suitable for the size portion he wants of that particular food—10 oz. of a complete stew, say, or 6 oz. of curried lamb, for which he prepares instant rice.

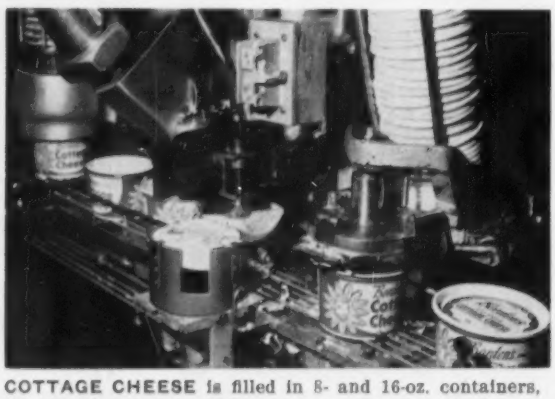
Complete directions for use, portion sizes, ingredient lists, and all the other esthetic and legal demands on a food package, can be met. And these are not destroyed in opening the packages.

*Packaging Engineering, Reinhold Publishing Corp., New York City, 1954.

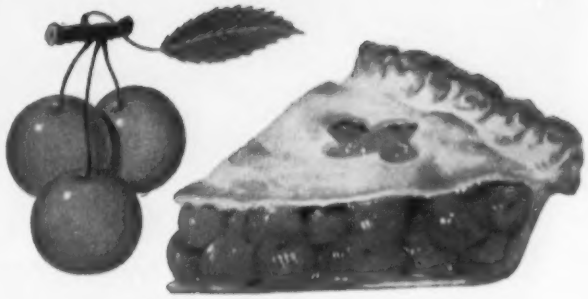
Ice Cream, Cottage Cheese Filled at High Speeds



AUTOMATIC machines are adapted to fill these containers at maximum rated speeds. Here, ice cream sundaes are made continuously on double-line unit.



COTTAGE CHEESE is filled in 8- and 16-oz. containers, 65 and 50 per min. with two men. Special attachment (center) places parchment disk on cheese.



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2. Do you want to: increase viscosity?____ gel?____ stabilize?____

3. Approximate pH of your product?____

Name____ Title____

Company____

Address____

City____ Zone____ State____

CONTINENTAL *Landmarks*

Periodic progress reports of interest and value to the food processing field

Significant Development in Beaded Cans

New cluster-beaded cans offer greater paneling resistance—increased axial strength

A new kind of beaded can, made with two clusters of narrow beads packed equidistant from the ends of the container, now offers packers substantial advantages over the conventional wide-beaded can.

In addition to improved axial strength and paneling resistance, Continental's three sizes of cluster-beaded cans provide the following extra benefits:

1. **Less metal exposure in enameled cans.** Absence of inside tabs eliminates possibility of enamel damage at side-seam, thus reducing metal exposure.

2. **Cleaner inside surface.** Cluster-beaded cans have no inside tabs—hence no uneven soldering.

3. **Better labeling surface.** The new cluster-beaded can offers much more flat surface to assure positive adhesion of labels and reduce the chance of tearing or breaking.

Continental's cluster-beaded cans were introduced to the food packing industry less than a year ago, and are now in extensive commercial use. This is typical of the many new packaging ideas now coming from our Metal Division research and development center in Chicago—as well as Continental laboratories coast to coast.

CONTINENTAL CAN COMPANY

EASTERN DIVISION: 100 E. 42nd St., New York 17
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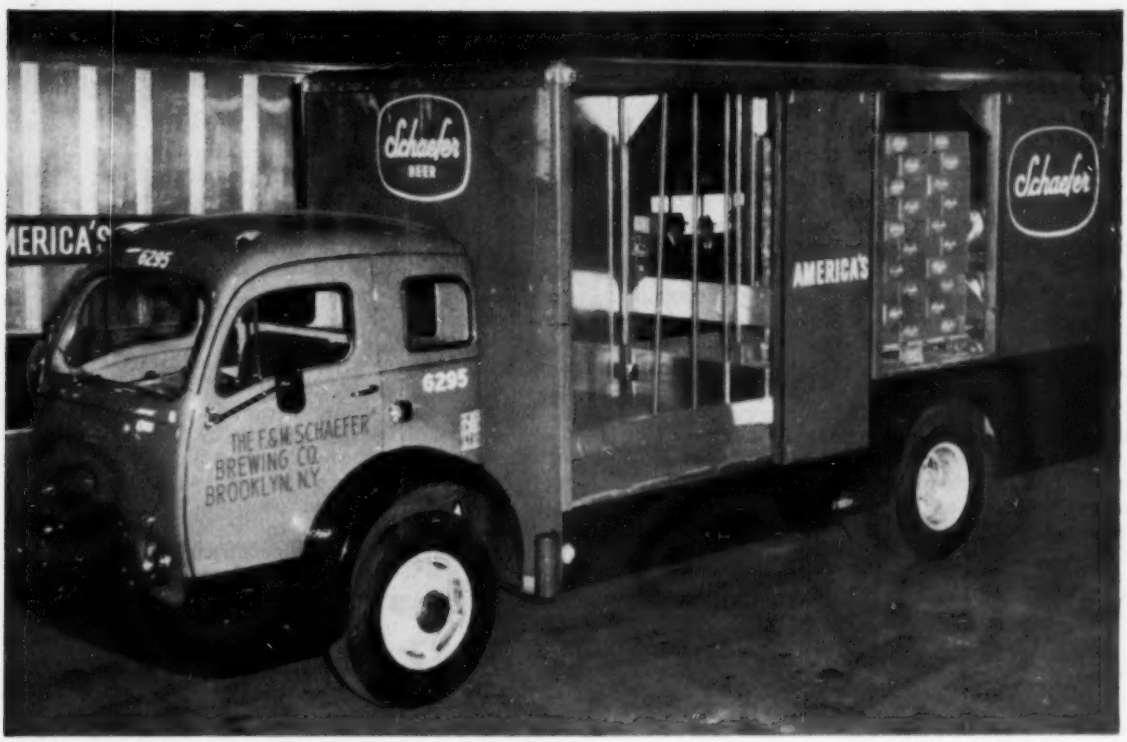
TAILOR MADE PACKAGE SERVICE



SLEEK, new fleet vehicle reflects skilled and imaginative engineering that transformed a "drawing board dream" into a paying reality. Photo reveals accessibility for loading.

Up payload, handling-ease, and safety with

New 8-Compartment Truck

WHAT THE COMPANY CALLS "a drawing board dream that became a reality" is the newest addition to the F. & M. Schaefer Brewing Co. truck fleet. It is a sleek new route vehicle that is netting these distribution advantages:

Increased payload without increase in truck size

Super-easy loading and unloading of case and keg beer

Added safety for driver and helper

Reduced breakage in cargo.

The new truck boasts many features, the most basic being its White cab-over-engine on Model 3020 chassis. The drop-frame chassis places 75% of the body floor only 31 in. above road level (about 24 in. above average sidewalk). The rest of the floor is 46 in. above the road—still a full 2 in. lower than the conventional truck floor height of 48 in.

This low floor level makes it easy for driver and helper to move in and out of the truck. Once the higher cases are removed, they may even unload from the street.

The body of the vehicle is 17 ft. long, 3 ft. longer than a standard truck in the Schaefer fleet. But overall length remains the same in both trucks—22 ft. Thus, the new truck, though providing 21% more cubical body capacity, occupies no more garage space than a regular vehicle.

With its aluminum body, the new truck weighs only 3,200 lb. when compared to its 4,800-lb. steel-body predecessor. Weight statistics:

Chassis weight	8,400 lb.
Aluminum body weight	3,200
Empty vehicle weight	11,600
Payload weight	16,000
Gross loaded weight	27,000
Gross allowable weight (N. Y., N. J., Conn.)	30,000

So even with increased payload of 1,600 lb., the truck is well within the gross limits of the states in which it operates.

Body design is unusual in that there are doors on both sides and at the rear, though it is of the panel type. These sliding doors are hung at the top on ball-bearing rollers. The original design called for piano-hinge bi-fold doors, but these were found inadequate because of the vulnerability of the hinges and the space required to swing them open.

Doors Offer Easy Access

There are five doors, two on each side and one at the rear. Those directly behind the cab are in three parts. Those above the wheel housing are one part. And the rear door has three parts.

All open into the eight-section truck interior, four on each side of the longitudinal centerline.

Pallets are loaded into the six lower sections by fork-lift trucks working at floor level. Some elevation is needed for the two higher sections on the wheel housing.

Access to the four forward sections is gained by sliding the three-panel doors to the rear. To load the two sections above the wheel housing, the one-part doors are slid to the rear outside of the only fixed side panels. Access to the two rear sections is gained by cross-sliding the three sections of the rear door.

Crew Work Space

Two pallets are loaded into all of the sections, except the two just ahead of the wheel housing. In the left section is an empty pallet. This is used for stacking and storing returnable empties collected along the driver's route.

The other empty section provides a working area for the driver and his helper. From here they can reach all of the other sections, since there are no solid, stationary section dividers.

The two rear sections are well-suited to keg loading when hauling split loads.

Placing the work area section on the left adds a distinct safety factor. The men work only on the side away from traffic. Another safety angle is the non-skid abrasive flooring. The same material is used for the steps at side and rear.

Because of the many movable panels, it was necessary to incorporate some body-stiffening in the construction. This was accomplished by placing posts at each corner of the wheel housing, with heavy transverse braces to the roof.

Preventing Cargo Shift

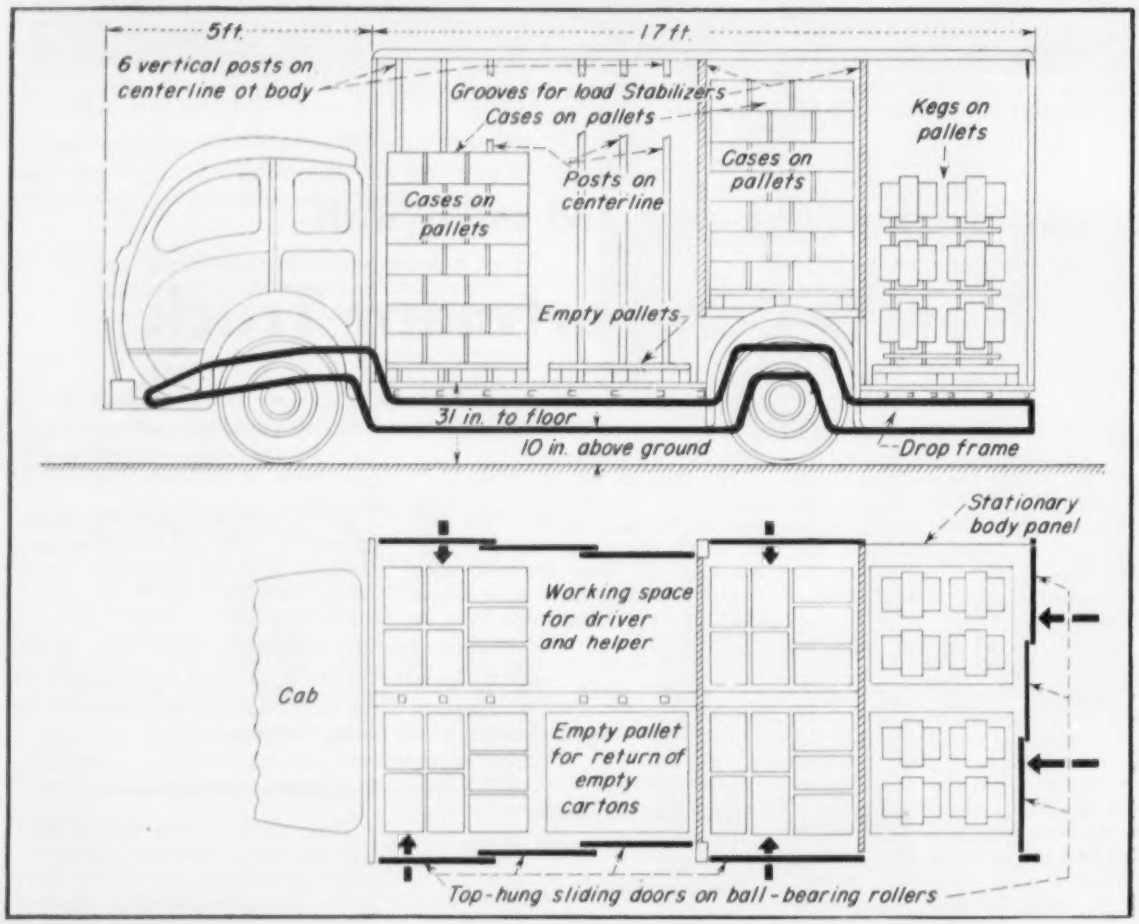
Five stationary posts and one movable (but not removable) one are located along the centerline of the four forward loading sections. These keep the tracks of the roller-bearing doors in line, despite any weaving motion apparent when the truck is in operation.

Since there are no solid dividers, load stabilizers had to be included in the truck's construction. Two are located at the front and rear transverse edges of the wheel housing, extending across the body.

The stabilizers are ¾-in. plywood board 10 in. high, held in place by channels at the body sides. Spring-loaded pins secure them.

As the load diminishes, the driver may lower the boards to keep the cases from shifting. The stabilizers, along with the six centerline posts in the forward compartments, have worked to eliminate breakage.

Pallet used is a standard 36x44-in. four-way-entry, nine-block, non-reversible type. Each loads about 2,500 lb. Six pallet loads make up the total payload.



X-Ray View of Route Truck

SLIDING DOOR positions are shown in diagram. Heavy arrows indicate direction of pallet loading for kegs and cases. Note low-slung frame that affords handier loading.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

How to Find the Strength of Salt Brines—Accurately

In most of today's plants, the type of hydrometer called a Salometer can generally be used to measure the strength of salt brines most accurately. This device (similar in principle to the hydrometer which checks the condition of your car's battery) is convenient to use—and its scale permits fast calculations for a variety of plant needs. The Salometer scale reads from 0° in pure water to 100° in saturated brine, with each degree representing a percentage of fully saturated brine.

Using the Salometer with maximum accuracy, however, isn't just a matter of reading the scale. A number of simple precautions must also be taken to make sure the Salometer records correct brine strength. Here they are:

1. Check the temperature of the brine. Since most Salometers are calibrated for reading at 60° F., brine temperature should be kept at this level during testing. When other brine temperatures are encountered, it is necessary to use the following table of simple correction factors. These will help provide a completely accurate measurement of brine strength.

APPROXIMATE CORRECTION IN SALOMETER DEGREES

Observed Salometer reading	Subtract per degree below 60° F.	Add per degree above 60° F.
0 to 10	0.049	0.060
11 to 20	0.064	0.082
21 to 30	0.077	0.094
31 to 40	0.087	0.103
41 to 50	0.095	0.112
51 to 60	0.102	0.118
61 to 70	0.107	0.123
71 to 80	0.112	0.128
81 to 90	0.116	0.131
91 to 100	0.120	0.134

For measuring cold brines, such as those used in meat-packing plants, special 38° F. Salometers may be used. Special temperature-correction factors are available when using this type of Salometer to test brines above or below 38° F.

2. Brine should be tested only in a straight-walled cylinder made of clear glass—set on a level surface. Any moisture that collects on the outside of the cylinder should be wiped off before testing procedures start.

3. Salometer stem must be thoroughly dry, clean, and free from grease or caked salt crystals. Also, the Salometer should not touch the sides of the cylinder when readings are taken. It should be read with the stem in a vertical position.

4. Check new Salometers by placing them first in clear water; reading should be 0° S. Then empty the cylinder, rinse with a saturated salt solution, and refill with fully saturated brine; reading should be 100° S. Both water and brine should be at 60° F.

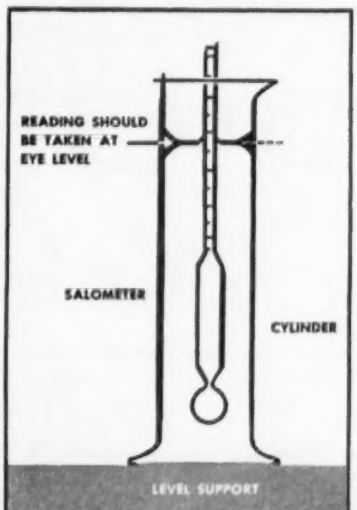


Illustration showing the proper eye level for reading a free-floating Salometer in a straight-walled glass cylinder.

5. Correct reading technique. Brine tends to rise along the sides of a glass cylinder, forming a concave surface known as a meniscus. For correct reading, the eye should be brought to a point level with the *bottom* of this meniscus. Errors of two or three degrees are possible if reading is taken at the point where the brine has risen along the sides of the cylinder.

Special Salometers. In the canning industry, where brine is used for quality grading, a different type of Salometer is often used. It's graduated on a scale where 100° S. represents brine containing 25% salt, instead of the normal 26.395%. Special hydrometers may also be used in the tanning or chemical industries. But the same procedures outlined here must always be followed when brine is to be tested—no matter what type of hydrometer a plant uses.

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Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt or brine you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on testing brine strength—contact your nearest International sales office.

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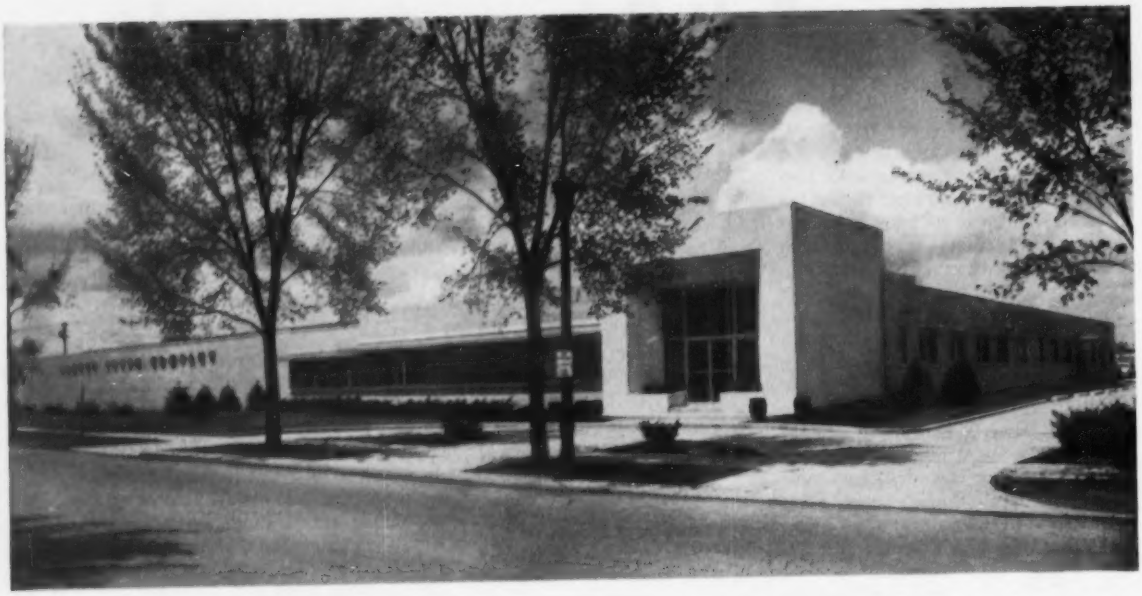
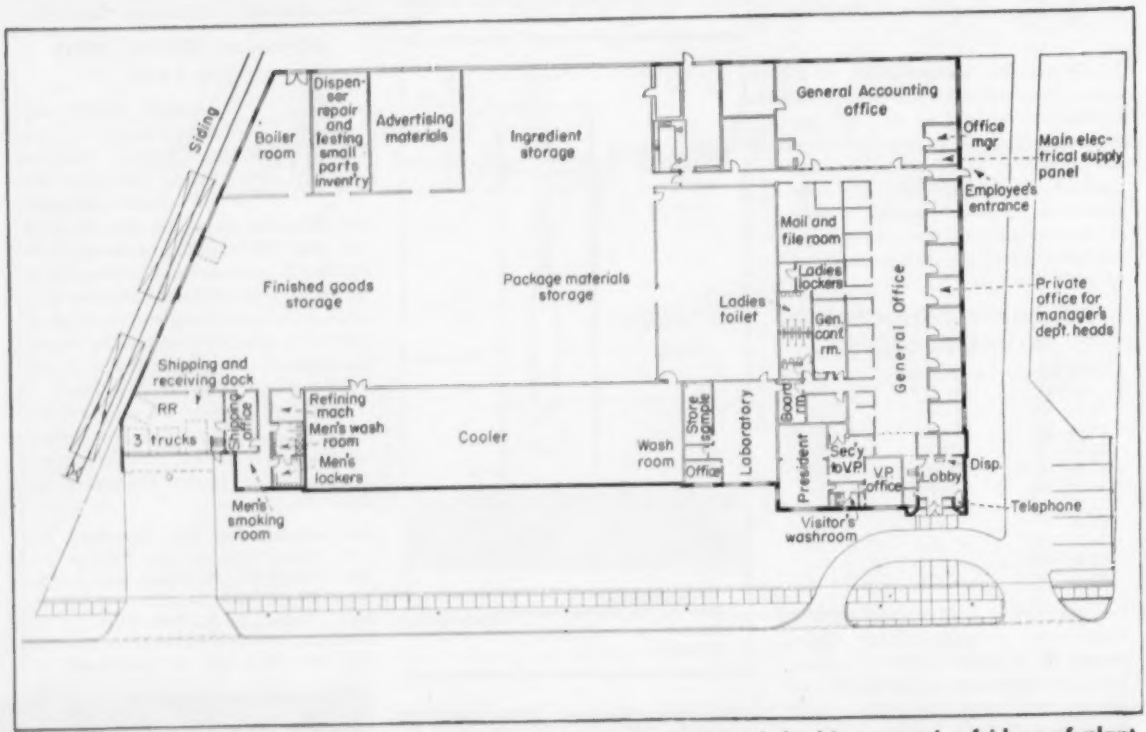




TO ACHIEVE this efficient layout, the company and its architect tapped the big reservoir of ideas of plant employees—workers who had long faced everyday problems and knew what was needed.

. . . Lowers Costs, Tightens Control, And Speeds Operations

FE STAFF

TREND IN THE DESIGN of today's suburban food plants—especially single-story ones—is to enhance the beauty of the locality. And it's done through careful, modern industrial architectural planning in which the old property-depreciating elements are carefully avoided.

▶Typical, in this respect, is the spanking-new plant of the Orange Crush Co. in a zoned-for-industry, but residential, section of Evanston, Ill.

This single-story building is constructed of buff-colored brick, with entrance featuring massive limestone blocks, glass panels, and doors.

It snugs into a 100,000-sq.-ft. site that already contained mature trees. All that was needed was to plant a lawn, evergreens, and flowering shrubs.

It was designed not only for processing many different flavored syrups and concentrates for bottlers and distributors, but also to serve as home office and warehouse. Another objective was to increase efficiency in handling shipments to customers.

Unlike the old 3-story facility near Chicago's loop, this structure is served with a railroad siding. Formerly, it was necessary to haul in perishable fruit juices in refrigerated trucks during warmer months. Now, they are directly brought in from reefers.

Multi-Service Lab

Another quality-safeguarding role is the firm's complete, cost-free beverage-laboratory service to its bottlers. Employed here is a check system that requires bottlers to submit samples at least every month. These are carefully analyzed, with resulting reports promptly sent to bottlers.

Those bottlers whose products meet specifications stand to win a certificate of award based on an annual rating.

Troubleshooting is another task carried out by this lab. When bottlers run into difficulty, assistance is given them either over the phone, through letters, or by plant visits. As a side note, engineering aid is also provided.

To keep a step ahead, the lab. carries on researches to improve present products, and develop new ones.

About Plant Layout

The most important area of the new plant is that occupied by the processing department, where blending and packaging are carried out. Bulk of the remaining area is comprised of general and executive offices, laboratories, warehouse, and refrigerated storage.

Also provided are rooms for shipping and receiving, men's lockers, refrigeration machinery, boilers, dispenser repairs, advertising materials, kitchen, and lunchroom.

Movement of palletized materials is straight-through and unimpeded. Packaging materials are fork-truck-hauled to the warehouse. Ingredients like certified colors, caramel, fruit acids, etc., are moved to the warehouse area, which is near, and diagonal to, the processing room. Perishable juices go to the cooler, which is also next to the process room. And finished case goods out of process are trucked to the portion of the warehouse area which is next to the R.R. siding.

Six railroad cars can be spotted along west side of warehouse section, and the shipping and receiving dock handles three trucks, one freight car.

The cooler is kept at 32-34F. to prevent spoilage of perishable fruit juices, cased finished goods, and lab hold-over samples. Refrigeration is furnished by one 5- and two 10-hp. Freon compressors.

Cooler is insulated with Foamglas (walls and ceilings 4 in., floor 6 in.). Walls are covered with cement plaster, ceiling with Transite. The floor has 4 in. of concrete above and below the insulation.

The liquid-sugar handling system comprises stainless steel pipes, fittings, valves, and pumps. Tank truck shipments are received by hooking up flexible hose to a sanitary-type valve at the shipping dock. Syrup is then pumped through 350 ft. of 3-in. stainless pipe to a 3,500-gal. tank.

This pipe is kept full at all times so that the line does not have to be blown down. This practice, too, curbs chances of mold or yeast growth. The pipe is suspended from a T-beam by clamp-type hangers employing stainless steel yoke-type hooks.

Air circulated over the syrup surface in the tank is first pulled in by fan through a glass filter, and then sterilized by an ultraviolet lamp. This lamp also sterilizes syrup. It is fitted within a stainless steel housing atop the tank.

Liquid sugar is discharged from the tank at a 30-gpm. rate by a sanitary Waukesha pump. It goes through a 2-in. stainless line to four stainless mixing tanks (1,000 and 2,000 gal.). A feed-off goes into any of a dozen smaller mixers (150-500 gal.).

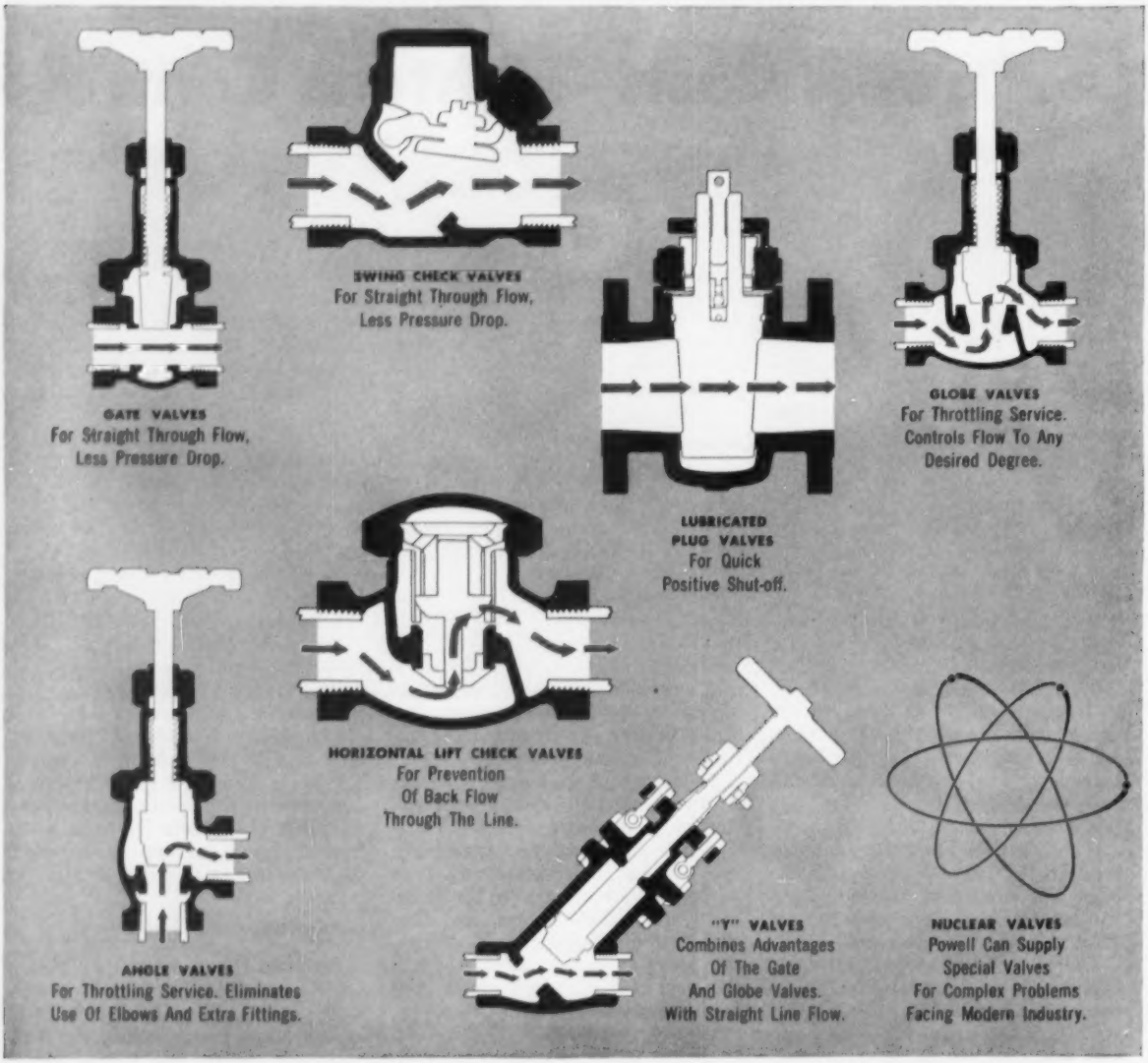
Concentrates and Juices

Fountain syrups and bottler's concentrates are blended directly in the large mixers. Other ingredients, such as fruit juices, flavors, colors, and fruit acids, are chuted into mixers, going from a mezzanine through a 12-in. dia. stainless pipe.

Products other than Orange Crush are delivered to a 13-spout rotary filler (Crown Cork & Seal). Here, either 1-gal. jars or tins are filled at 30-per-min. Jars continue to capping machine (Tite Cap), while cans go to a 4-spindle rotary seamer (Angelus). Jars and cans are packed and sealed into shipping cases.

Palletized cases are then transferred by fork-truck into the warehouse section. In movement of fork-trucks between processing and warehouse areas, door damage is reduced, since the door is built of flexible, lightweight, shock-absorbing rubber that "gives" when struck.

POWELL
for all valve needs



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Powell can supply this right valve—*made right* of the right material*. Every part of every valve must pass rigid inspection. And as a final step in manufacture, every Powell Valve has *Performance Verified* through an *actual line test*.

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Ole Sage Episode

HOW CAN YOU GET THE RIGHT MEN FOR THE JOB?

IVAN C. MILLER
Associate Editor, "Food Engineering"

Barney Hasbrook raised a probing finger. "Are you implying you're really that much better off because of this selective business?"

AT THE FIRST OPPORTUNITY, Personnel Manager Milt Sorenson swung the new meeting of the Guff & Gripe Luncheon Club over from table talk and into the main issue on the agenda.

"Our question today is getting the right men for the job," he called down the table. "And that must be a big subject with Ed, here, since his company soon will be hitting into its peak season."

"Right you are," agreed Ed Strong, superintendent of Zenith Canning Co. "In fact because of our peak, today'll be my last time at this luncheon for several months."

"To put a question, then," resumed Milt, "how serious would it be if two of your best foremen quit in the next couple of weeks?"

Ed groaned. "You're trying to ruin my day, Milt. I can tell you that if that had happened two or more years ago I'd have ended the season either in the hospital, the laughing academy, or a grave.

"You see, at that time we were fairly small operators for most of the year. So being small-staffed, the leaving of any foreman, especially one who was fairly efficient, was sure to cause disruptions in his department. And in other departments, too, since this sort of thing generally necessitates personnel shifts—moving men up the ladder to fill resultant vacancies.

"But in peak season," he continued, "the new lines, many green workers, extra foreman hours, and added responsibilities *really* build troubles up to the limit. During peaks, our foremen have been far too few and spread too thin."

Ed paused for a sip of his coffee, then grinning at Ole Sage, he went on: "Fortunately, and with very much thanks to Ole, we're ready this year for any such emergency, or even a stiffer blow. Oh, sure, if we lose several foremen my load certainly will be somewhat heavier. But as I said before, I'd hate to think what might have happened a couple of years ago."

Barney Hasbrook, industrial relations manager of Holstein Dairy Products Corp., raised a probing finger. "Are you implying you're really *that* much better off because of this selective business that Ole's handed you?"

"That's only part of it, Barney," resumed Ed, "You see, "two years ago hardly one of our foremen was experienced enough to take over another foreman's job, especially not during peak season. But that wasn't the worst of it. At that time we didn't have one worker we could shift to first-line management with any assurance that he'd work out. And during peak season, when employment has more than doubled, is no time to experiment with men you're not really sure of."

"Believe me, I know something about that," chimed in Batt Bulwark, works manager of Mull & Mull Co. "As I said at the last meeting, we've got some punk foremen we'd like to be rid of—except that the replacements would likely be worse. And, my gosh, when I think of the big expansion program we're facing . . ."

Ed again took over: "Well, we've been through that. At Zenith, throughout more than 18 months, we've had to meet heavy manpower needs—as required by the more than doubling of our off-season production, and the launching of new products, to boot.

"However, looking back on it, I wonder where we'd be if Ole hadn't insisted from the first on procurement and job-rating of employees in plenty of time to meet future management needs. I mean, starting right in on pre-training of the selected men for foremen. Even though we haven't been into the program very long, already it's showing promising results."

"Oh, we went through all that, too," Batt belittled. "Some years ago, one of our Johnny-come-lately v.-p.'s sold the old man the idea of hiring a bunch of boys from the colleges. This v.-p. got 'em in the plant to learn the business—planned to make top management out of them."

Batt then shot in his punch line: "Well, they all quit!"

He glowered belligerently around the table, then added: "Guess they didn't much like being grease monkeys, juggling retort crates, or hosing down . . . Just couldn't take it!"

"What you've just said, Batt," remarked Ole, entering the discussion for the first time, "confirms my long-held view that it's a grave mistake to hire those capable of filling better jobs than you can offer. But as for your important jobs, there *is* justification in hiring more people capable of filling them than you actually have positions to fill—since attrition usually takes a heavy toll of such men."

"I agree with you on that, Ole," volunteered Personnel

2 WAYS TO MISS

As Ole points out, employee selection can go off the beam in two different directions—either by placing too-good men in too-poor positions, or by putting too-poor men in too-good positions

Manager Si Worth. "When ability is teamed up with ambition, a compromise with a dull, boring routine may only be stomached as *training*. And even then not for long. None of us here could have helped fighting out of the ruts to get ahead. It was our natural instinct."

"But what, precisely, is *your* hiring formula, Ole," cut in Milt.

"It's easy to state," answered Ole. "But it's not so easy to follow. As near as possible, you should select those employees who best fit the requirements of the jobs to be filled.

"If a job has no future," he continued, "try to put in the 'stay-with-it' sort of individual—the fellow who's able to meet the task's requirements, but who doesn't have the ability or ambition to measure up to a higher-level job with more pay."

"Seems to me," grumbled Batt, "that everyone my outfit has hired has been that kind. Looks like we'll never finish paying for some of our hiring mistakes. That kind of worker doesn't die young."

"Yet, Batt, failure in either direction to place the right man in the right spot can be extravagantly costly," said Ole. "Especially since such failures lead to employee dissatisfaction, which can result in high absenteeism and turnover and in low productivity.

"On the other hand, competent selection and replacement usually results in gains solidly measurable in dollars and cents. And furthermore," continued Ole, "such an employment procedure usually will mean a lot to the individual."

"Yes, sauce for the goose is sauce for the gander," injected Si Worth. "When you satisfy each and all of your workers you've cleared one of your most hazardous hurdles."

"It's almost axiomatic," was Ole's follow-up. "The well-adjusted employee will give full worth to a job and grow and develop with it. And that's far more of an asset to his company and himself than a maladjusted, disgruntled drifter."

"That's a sop to my conscience," admitted Milt. "I'm plenty rough on frequent-job-change applicants—because they're likely to be costly hire-risks.

"This," he went on, "brings up the question to which I never seem to get a sure answer: What is the real cost of turnover?"

"The cost just in high blood pressure is too much," growled Batt.

"As for dollar cost," said Ole, "results from numerous surveys vary. But the findings do justify general conclusions. It costs thousands of dollars to replace executives, or sales and technical personnel, and from $200 to $300 to hire and bring up to standard the machine-operating type of clerk.

"Plant-employee replacement cost differs from industry to industry, but probably can be averaged out between $300 and $400.

Chided Batt: "Ole always gets reckless when he throws dollars around—someone else's, that is."

"Well, if you think that," came back Ole, "just listen to this: Some people stay with the same job for life, and 30 to 40 years on a job isn't unusual. On the other hand, some make changes several times a year. But to boil it down, statistics reliably indicate that 2 years actually is the time the average employee stays on a job.

"With better than 60,000,000 people employed in this country, that means more than 30,000,000 job changes per year—which figured at a conservative individual cost of $300 to $400 per year amounts to a total between $900,-000,000 and $1,200,000,000 annually!

"Ole's got himself all mixed up with the national debt," jibed Batt, as he snuffed out his cigar butt. "But right now it's back to the salt mine for me, even though we haven't said much about employee selection for advancement in management."

"That'll be for next time," called Milt, as the luncheon group broke up.

Readers: What's your slant on the questions raised in this Ole Sage Episode? You're invited to comment. Just address Editor, "Food Engineering," McGraw-Hill Pub. Co., 330 W. 42nd St., New York City 36.

From Ole's Notebook

Equity for All Workers

In the future, the proportion of office workers will increase. The new technology may displace workers at the machine, but it seems to require more and more office help.

Even where additional office workers are not needed their relative proportion and importance in the work force increases. In the past, unionized production workers have often received wage increases and benefits greater than those given office employees.

Accordingly, there is an accelerating need to insure a better balance of treatment for the whole work force. Failure to recognize that everybody who works for the company is entitled to compensation and benefits on an equitable basis leads only to employee dissatisfaction and friction. —*"Personnel," a publication of AMA*

Managerial Gage

Tests for measuring individuals to find their managerial potential can be of much assistance, since such important characteristics as capacity for learning, creative thinking, aptitude for work itself, and many of the personality charcteristics and social skills required to perform effectively can be determined by tests.—*Lawrence Greenberger, Kaufmann Department Stores.*

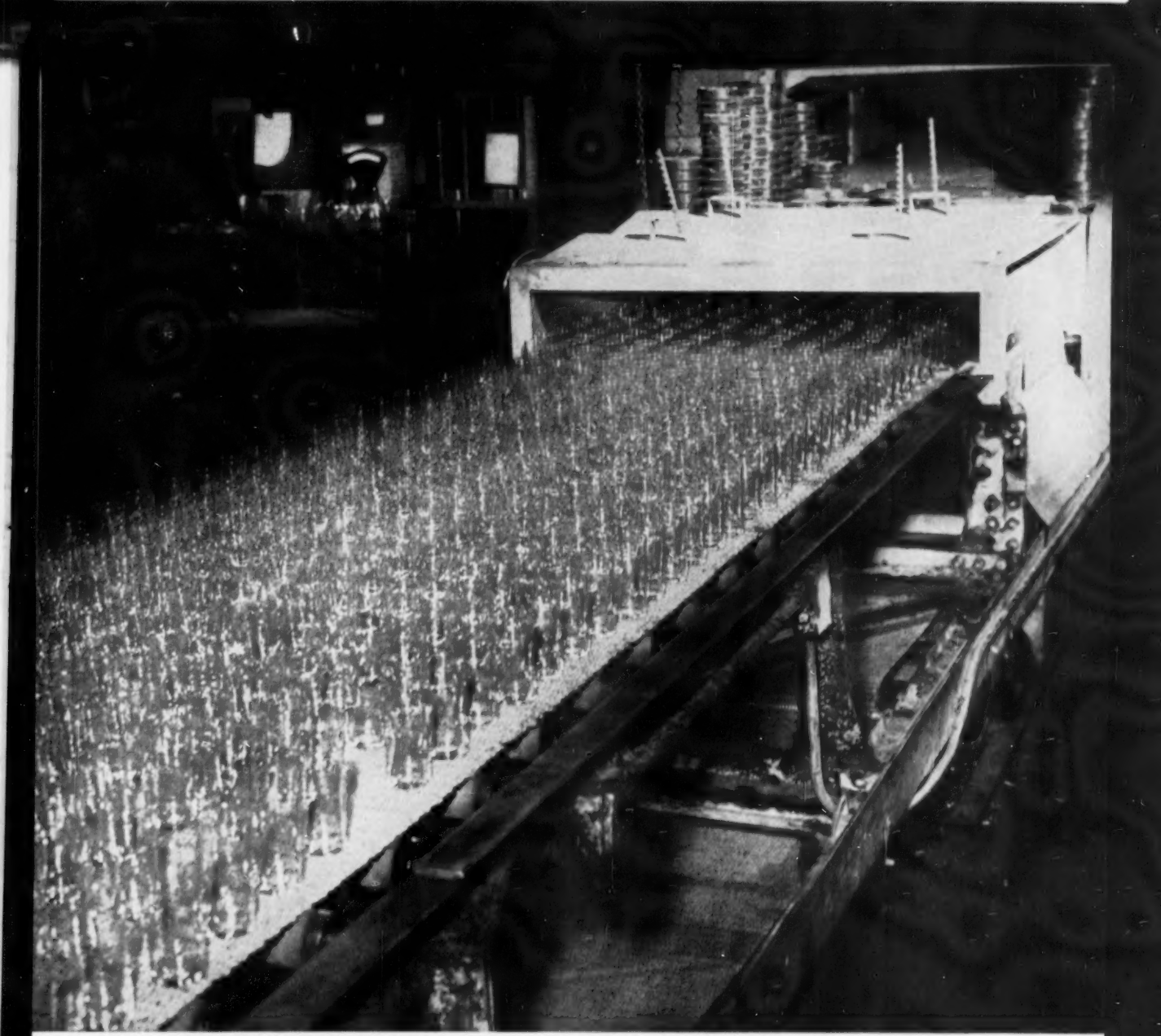
Many Birds, One Stone

By sensibly and fairly settling one grievance as rapidly as possible after a report of the occurrence, you may short-circuit many other grievances in the making.

Proper Leadership Needed

There is evidence that whenever a supervisor or manager abdicates his leadership role, and so fails to develop team spirit in his group, then other persons intent on building group loyalty will take over.

But often, the informal leadership that emerges will be accenting goals



Wissco Belts carry Libbey glassware through annealing lehr. The glassware—and the belts—are subjected to elevated temperatures for approximately an hour. This is another example of how...

FAMOUS NAMES

ride on WISSCO BELTS

Libbey Glass Division of Owens-Illinois

Libbey is a name that's well known for glassware of top quality. For its annealing operation, which helps insure this quality, Libbey purchased four Wissco Belts of thin, flat construction with improved lehr edge. High heat is applied at the beginning of the operation, and then gradually diminished. The glassware emerges at the cool end of the lehr with stresses and strains equalized. Wissco Alloy Processing Belts are the choice of many famous names in industry—leaders in their fields. You, too, will find Wissco the most economical and efficient belt for every processing operation—for metals, ceramics, glass annealing and decorating.

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York Compressor Oils are the only oils on the market developed and produced by a leading manufacturer of refrigeration compressors

For over 30 years York has been producing oils specifically compounded and refined for the special requirements of refrigeration and air conditioning equipment. The knowledge and experience gained from these years of service and maintenance for such equipment helps York produce the very best in Refrigeration Compressor Oils. *Any* make of compressor benefits from their use.

York Oils are super-refined to withstand *both* high and low operating temperatures and bearing pressures under which they must lubricate moving parts of a refrigerant compressor. York Oil keeps compressors free of carbon on valves and gummy deposits on piston rings. It is chemically stable, bone dry, won't break down.

All over the world, trouble-free operation of hundreds of thousands of compressors lubricated with York Oils provides overwhelming evidence of York Oils' superior quality and ability to function perfectly under widely varying conditions.

YORK OIL IS STOCKED AT ALL YORK CORPORATION DISTRICT WAREHOUSES.

It always pays to use York Accessories & Supplies:

AIR FILTERS • AUTOMATIC CONTROLS • BRINE TESTING SETS • CHARGING CONNECTIONS • COILS AND PIPING • COLD STORAGE DOORS
FREON REFRIGERANTS • GAS MASKS • ICE CANS • ICE PLANT ACCESSORIES • MOTORS • PUMPS • OILS • OIL TRAPS • PURGE DEVICES
RECEIVERS • SUCTION TRAPS • VALVES AND FITTINGS

York refrigeration air conditioning

the quality name in refrigeration oils

HEADQUARTERS FOR
MECHANICAL COOLING SINCE 1885

YORK
CORPORATION

that are at variance with those of the overall organization. And this emphasizes the need of care in establishing a constituted group leadership.—*"Motivation: The Core of Management," a publication of the AMA*

Bargaining Pitfalls

All too often, businessmen run into a variety of pitfalls along the collective-bargaining road. As a guide to sounder, constructive industrial relations, it is well to be aware of some of the more common traps.

Union strategy often calls for "foot in the door" techniques whereby seemingly unimportant demands are traded for issues which currently loom as important on management's horizon.

More than one businessman has applauded his own acumen when he has bought off certain union demands by the simple expedient of making concessions on issues which appear to cost very little or mean very little *at the time* to the company.—*Richard P. Doherty, President, Television-Radio Management Corp., Washington, D. C.*

Executives Gaged on Labor

Companies headed by liberal arts graduates are more likely to have successful labor relations than those headed by specialists like lawyers, engineers, scientists, or accountants, it appears from a study by Dr. Arthur W. Ayers, Department of Psychology, U. of Maryland.

In firms with good labor relations, executives had spent more time with their companies and more time in supervisory positions than their counterparts in companies with less successful labor relations.

In fact, they were likely to have had all their work experience in the company with which they were currently associated. Moreover, a greater number of executives in "peaceful" companies were reared in medium-sized or large cities; whereas those in firms with turbulent labor histories more often came from small towns or rural areas.

No significant difference between the two groups was found in such factors as age, marital status, recreational activity, or experience outside industry. Nor was there any difference in the number holding college degrees.

Executives surveyed were those active in formulating and administering employee relations policies.

In this examination, a management panel of the National Planning Assn. distinguished the specific firms with good labor status. And biographical data were obtained on 43 executives in 6 companies.

Firms with poor status composed a group that very frequently had referred cases to arbitrating bodies and the courts. And here biographical data covered 78 executives from 9 companies, out of an original selection of 18.

To insure that the sample was representative, researchers compared it with a group of 900 industrial executives surveyed earlier by *Fortune* magazine.—*"Industrial Relations News."*

Voting Record Hailed

Employee participation in industrial representation elections is impressive.

In the past 20 years, the National Labor Relations Board has conducted some 75,550 elections. Total employees eligible to vote in these elections numbered over 13½ million. Of these, more than 11½ million cast ballots.

In other words, more than 85% of the eligibles exercise their franchise —which may be taken as something of a gage of the effectiveness of the whole operation.—*Theophil C. Kammholz, General Counsel, NLRB, before National Affairs Forum of the Pittsburgh Chamber of Commerce.*

Listening Is Criterion

Contrary to popular opinion, the best salesmen in America are not those who are the best talkers but those who are the best *listeners*. And this applies equally well to the best managers.—*Lawrence Greenberger, Kaufmann Department Stores.*

Tapping People's Power

Leadership in human relations is the chief executive's job. And loyalty he aims downward begets loyalty aimed upward.

In industrial America, men yearn to learn. Top management must provide the opportunity. The executive at any level who does a little more than expected of him will stand out.

This country is tops in its capacity to produce, its desire to perform research and seek knowledge, and its willingness to work hard. If the chief executive of any company of any size will exert the same degree of leadership in the fiekl of human relations—then he will find that the H-bomb is just a penny fire cracker in comparison with the power of people working together with diligence for the attainment of a mutually desirable goal.—*F. J. Bell, Executive Vice-President, National Automobile Dealers Assn., before California Personnel Management Assn.*

Charges vs. Unions

A breakdown of the 381 "unfair practice" charges filed against unions during the first quarter of 1956 show:

226, or 60%, filed by employees.
27, or 7%, filed by other unions.
128, or 33%, filed by employers.

The 381 charges included 68 cases of illegal boycott and 20 charges of jurisdictional disputes.

Employees also continued using their Taft-Hartley right to repudiate compulsory unionism, thus to vote out a union they no longer want. In three out of four deauthorization elections, they voted to revoke union shop clauses and to prevent such contracts by their union in the future.

In 17 out of 28 decertification elections, or 60%, employees voted to get rid of their existing union and deal directly with their employer in the future.—*Legal Dept., National Assn. of Manufacturers, Washington.*

Prepare the New Foreman

"When a man is promoted from the ranks to a salaried foreman, he should be put through a management indoctrination training program. Don't leave anything to happenstance. Don't simply send him into his new job without preparation, because we should know that the transition cannot be made with the snap of a finger."—*Herbert O. Eby, Labor Relations Director, Pittsburgh Plate Glass Co., before California Personnel Management Assn.*

EDITORIALS
FRANK K. LAWLER
Editor

In Behalf of Progress . . .

Automation Is Routine Progress—Take It in Stride

Automation has been given such a big play in modern industry that the average food plant operator is perhaps just a bit frightened by it. This is unfortunate. Automation is something that should be understood and taken in stride, and applied everywhere to the extent feasible.

There's no way to ignore it, push it aside as an unnecessary frill, or put it behind you so as to not let it worry you. Industry, make no mistake about it, is in the era of automation. And to survive, every food plant has to put it to work—at least on as large a scale as competitors—to reduce costs, increase capacity, and improve control of quality.

But it's really no cause for concern. Automation is merely an advanced stage of mechanization. You might call it "super mechanization." Factories have been mechanizing for so long that it's time they reached an advanced stage.

Most food factories mechanized materials handling years ago. And much of the automation coming into the food field is nothing more than the refinement of this mechanization. It is continuous mechanical handling of ingredients or products coupled with flow and level metering and control, and automatic proportioning.

Even in its most advanced stages, automation is merely the addition of mechanical, electronic, or pneumatic devices to control a mechanized operation. Certainly automatic controls are not unique. It is just that they are being applied in more places—sometimes in new forms and in new ways. Then as new processes are developed, the designers take advantage of controls to achieve continuous operation, plus a capacity and quality performance not otherwise possible.

Any competent technical man or plant manager can apply automation to some degree. He can envisage control applications to super-mechanize some of his operations. And he should—if he wants his company to stay in business.

It may help to think of automation as the application of time and motion study—of work simplification—to machines. And a mechanized production operation can be analyzed and charted step by step, and each action studied critically with this question in mind: "Can this step or series of steps be eliminated or put under automatic control by additional mechanization or instrumentation?"

Sometimes the super-mechanization can be achieved by a simple device such as a pneumatic, hydraulic, or electric actuating unit (or servo-mechanism) activated through relays by electrical contacts or limit switches. In other instances, an instrument which senses changes in a process factor may be needed to activate a mechanical action. Occasionally, a more modern automatic process or materials handling unit may be the answer.

In any event, the approach is to become familiar with the latest machines and instruments available for performing and controlling unit operations in the food factory. Then cast an eye at each and every existing process and operation and ask: "Is this the best way to do it?"

And don't assume that anything is right just because it fits traditional practice. Practically all conventional methods can be improved in the light of today's know-how and equipment. Perhaps the conventional way was the best that could be done at the time it was developed. But post-war progress has produced a vast array of new know-how, tools, and materials that permit great refinement in plant and process engineering.

Anyone can become apprised of the nature and performance characteristics of these developments by perusing the literature and advertisements of the manufacturers, attending equipment shows, and reading a food engineering magazine.

Once you get into the swing of refined mechanization—and learn to look at it as simplification of production operations—you'll find it highly interesting, and extremely rewarding. By spotting the opportunities in your plant, you will be performing an invaluable service. Your company can get the detailed application engineering done by experts with consulting or equipment firms. But nothing will be achieved until someone comes up with the idea.

Should you have the occasion to allay any fear of automation on the part of workers, you might take a tip from Swift. It explains that automation will not make sudden changes in jobs, but that there will be an orderly and gradual improvement in machines and methods. Swift also points out that the effort and money put into better machines and methods have resulted in a greater number of jobs, easier jobs, and safer jobs. This in turn has meant greater production and higher wages.

Automation, the packer concludes, is absolutely essential to maintain and improve the competitive position. "If we don't do it, somebody else will."

That goes for your company, too.

If your customers gave your products a "bug count"

These Petrie dishes give a graphic demonstration of the high degree of spore and yeast removal that can be achieved with Celite filtration.

CELITE FILTRATION removes spores and yeast plus all suspended impurities

How can you be sure that your products are at their very best when they go into the laboratory of an important customer or prospect? One good way is to use the most thorough method of clarification available. That's Celite* diatomite filtration which gives you a filter cake hundreds of times finer than the finest wire mesh. It not only removes suspended impurities, but polishes filtrates to a brilliant sparkling clarity.

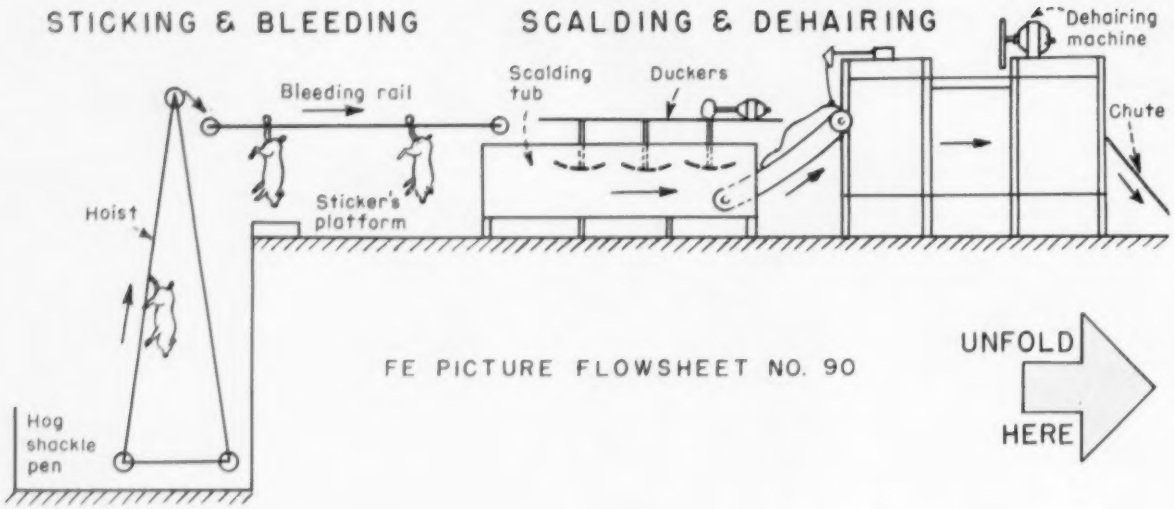
Celite is as economical as it is thorough. Only small amounts are required to keep the filter cake open. Fastest flow rates are obtained from the 2,500,000 filter channels in every square inch. And Celite can be used with almost any filter. Automatic operation eliminates the need for costly skilled labor.

Celite is being used successfully today for filtering sugar, beer, syrups, jellies, cooking oils and fats and many other products which at some stage are in a liquid state. Perhaps it offers advantages for your processes too. Write for full facts today.

For further information on Celite filtration for your products write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, address 565 Lakeshore Rd. E., Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

JM PRODUCTS **Johns-Manville CELITE FILTER AIDS**



Pork Processing—The Modern Way

Man-Hours are Cut, Performance Boosted, by New Units and Faster Methods

TOP-SPEED EQUIPMENT and many advanced techniques are featured in modern pork and sausage-making operations. The processing, as now carried out in a typical plant, is comprehensively detailed in our accompanying flowsheet.

Incoming hogs are shackled to a hoist and conveyed along the sticking and bleeding rail. They continue through a scalding tub, dehairer, depilator, singeing unit, polisher, and washer.

SPLIT HOGS are weighed, then mono-railed through this chill room on their way to the cutting table.

After inspection, hogs proceed to the dressing department. Here, heads are removed, the carcass is opened, and viscera are taken out for inspection and separation of parts. The carcass, split in two parts, then rides over a rail-scale and moves into the chill room (see photo).

From here, meat is conveyed past skilled butchers, who separate the hog into commercial cuts—feet, shoulders, hams, loins, ribs, salt pork, and renderable fat.

Fresh loins, ribs, and butts are packaged. Hams, bellies, and other butts are cured, washed, smoked, chilled, and wrapped. Also, unsmoked hams are canned, oven-baked, or boned and stuffed into molds and boiled.

After curing, bacon goes to a press, then a slicer-stacker and check-weighing and packaging line. Here, the latest device is an electronic scale that controls slicing to turn out bacon in exact ½- and 1-lb. units.

In making sausage, meat is ground and mixed with other ingredients in a silent cutter. After chilling, emulsion is loaded into a sausage stuffer that feeds an automatic linker.

Fresh sausage is immediately packed in a chilled room. Franks and bologna products are loaded in smoke cages and 'railed' through single-story smokehouses, cookers, showers, and chill room.

In some plants, smoking, cooking, and showering operations are all conducted in a single, combination house that conserves space and time.

Franks are finally machine-stripped from casings, weighed, packed, and overwrapped by machine. They are also machine-banded and bulk-packed in cartons.

For luncheon meats, emulsion is loaded into a stuffer, forced into molds, smoked, and chilled. Loaves are sliced and stacked by machine, then packaged and machine-overwrapped.

Chub items are prepared in a cooking kettle, loaded into a sausage stuffer, and fed directly into a chubbing machine.

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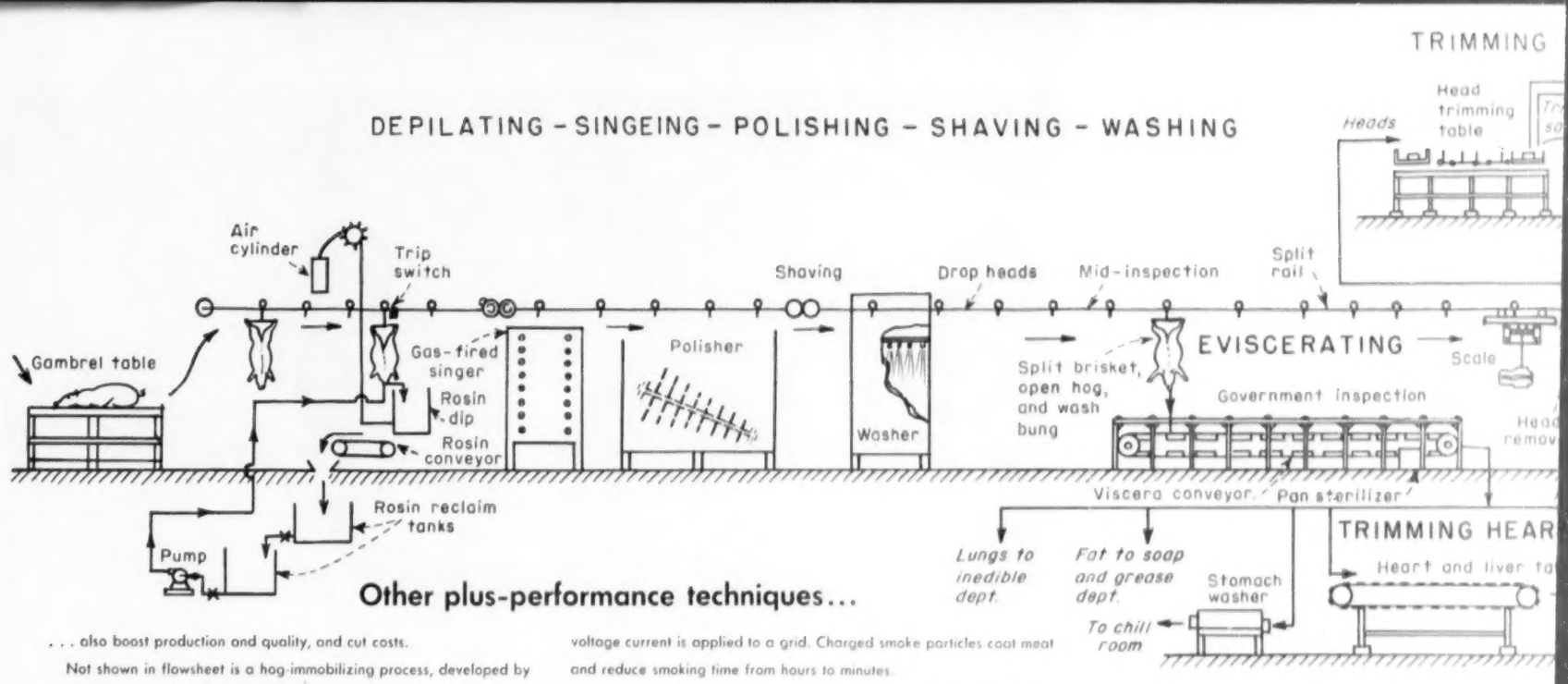


Other plus-performance techniques...

. . . also boost production and quality, and cut costs.

Not shown in flowsheet is a hog-immobilizing process, developed by Geo. A. Hormel & Co. (*Food Engineering* Award Winner).

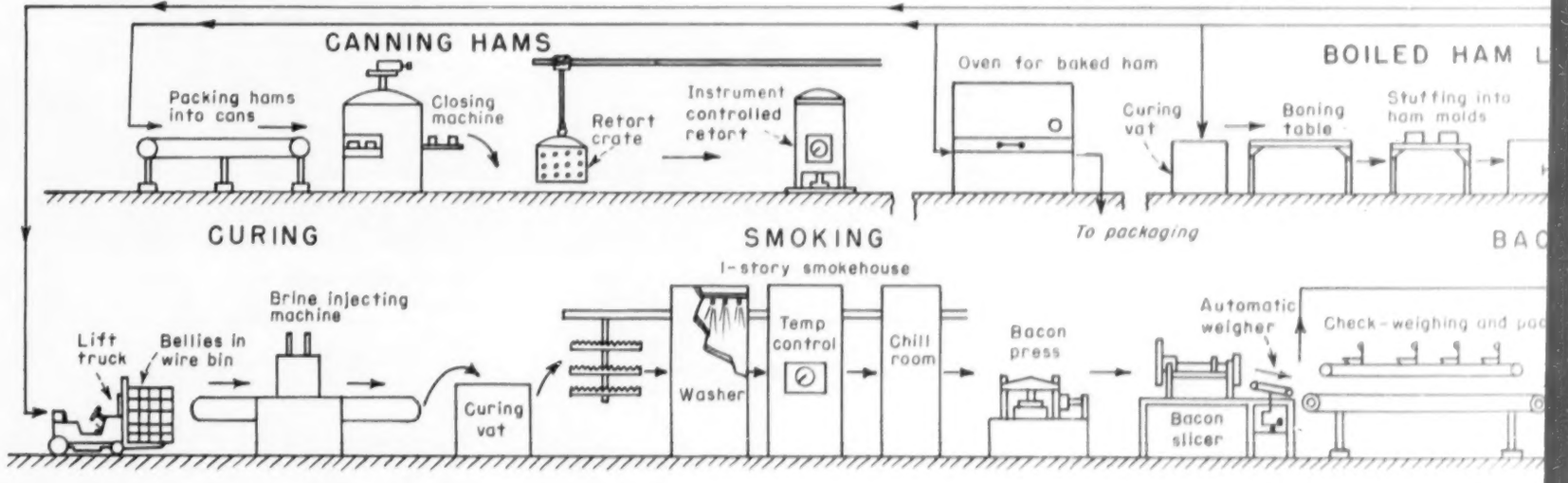
Here, animals are conveyed through a CO_2-filled tunnel, where they are gently put to sleep. Method cuts back-breaking work, enables recovery of more blood, and boosts product quality.

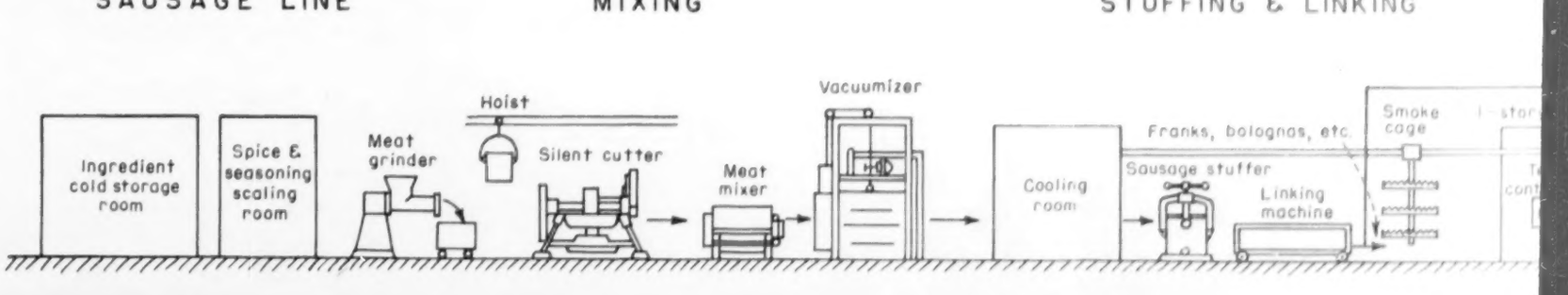
Another technique speeds smoking at Kingan & Co. Ham, bacon, and others are conveyed through an electrostatic smoking area, where high-voltage current is applied to a grid. Charged smoke particles coat meat and reduce smoking time from hours to minutes.

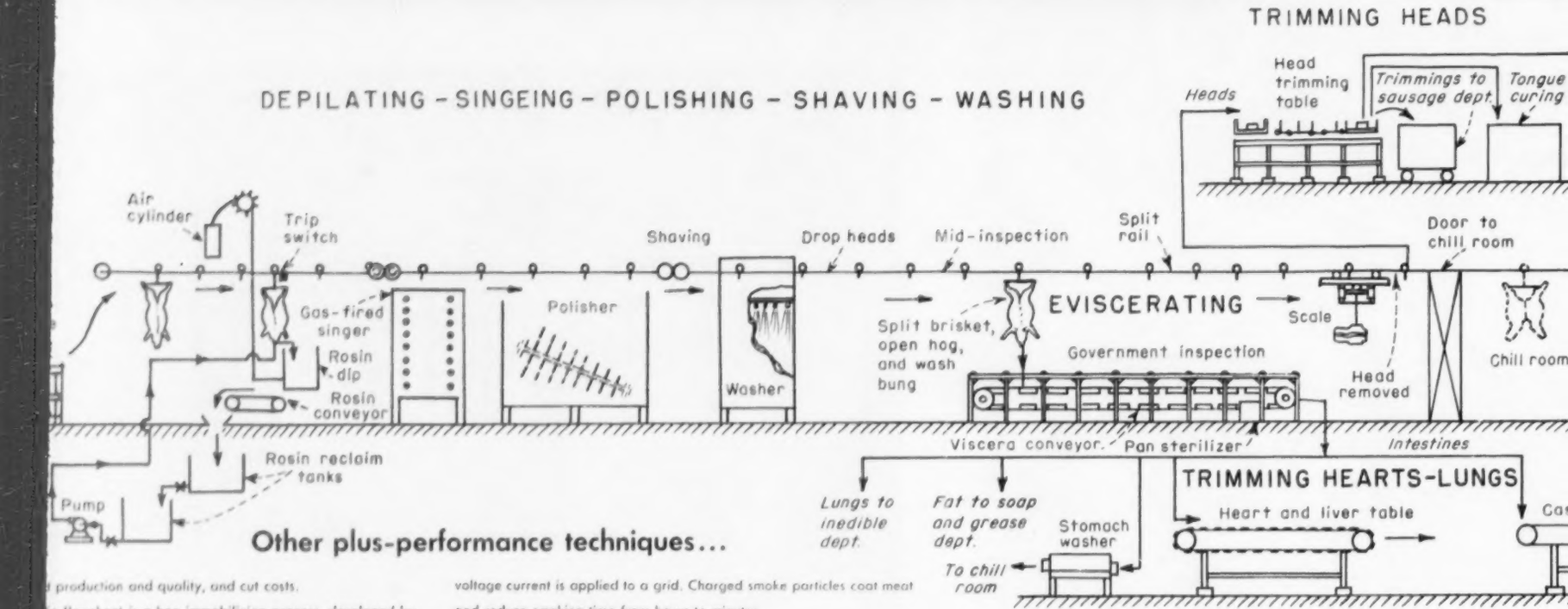
Still another Kingan operation is machine-canning of sausages. Equipment cuts sausages into small pieces, bunches them, and feeds eight at a time into cans by means of a plunger.

Finally, there is a continuous method for making liver sausage, meat spreads, and similar products. Employed is impact-in-air grinding and a continuous chubbing machine.

— *The Editors*







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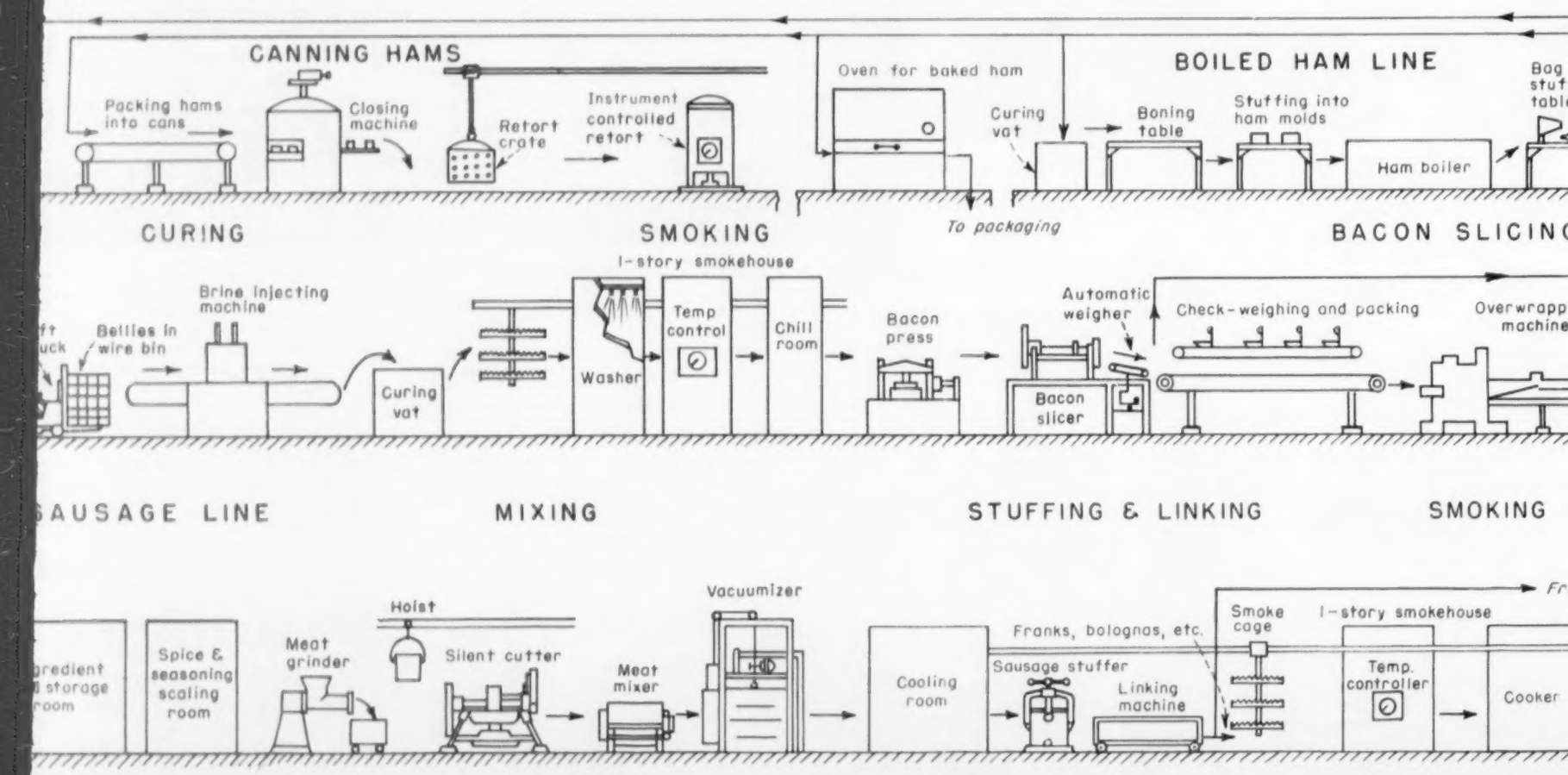
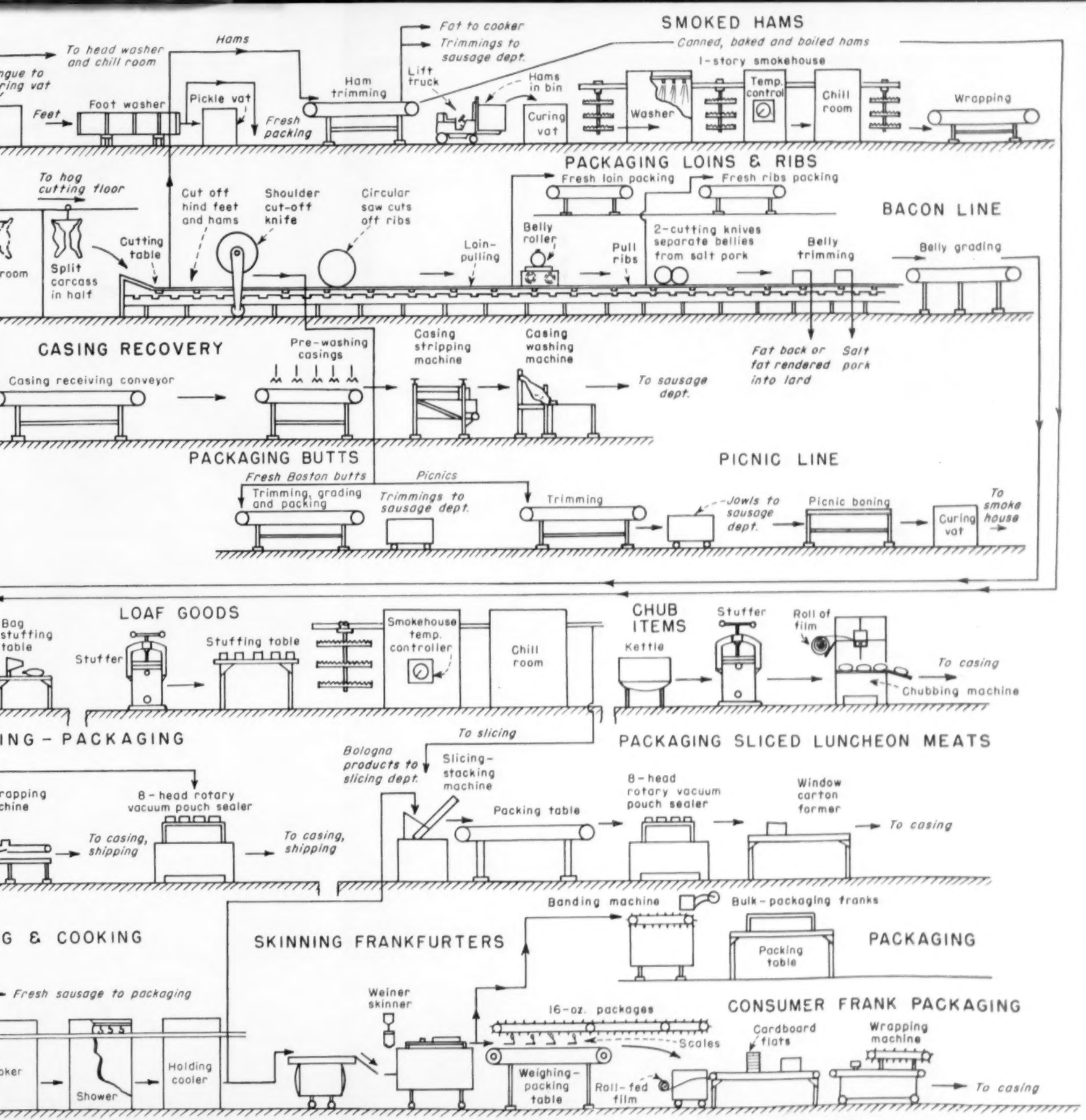
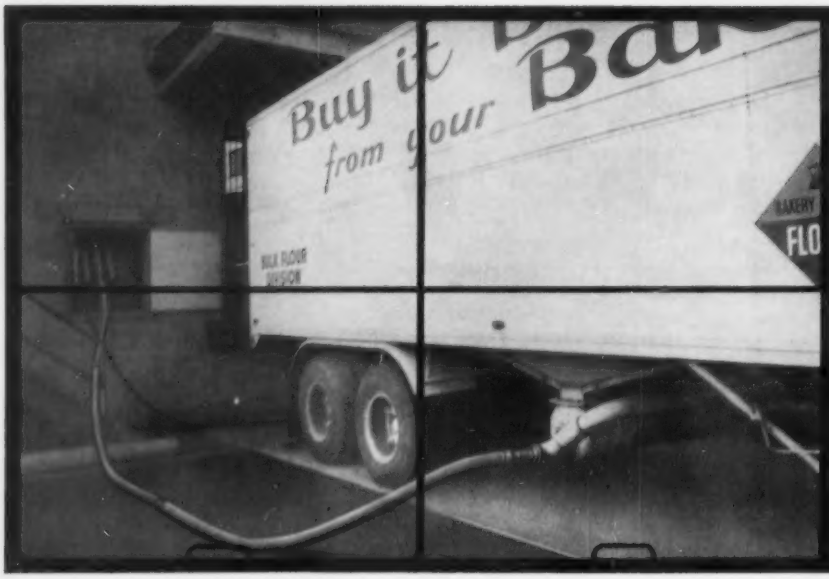



SMOKED HAMS
Canned, baked and boiled hams
1-story smokehouse
To head washer and chill room
Hams
Fat to cooker
Trimmings to sausage dept.
Lift truck
Hams in bin
Ham trimming
Foot washer
Pickle vat
Feet
Fresh packing
Curing vat
Washer
Temp. control
Chill room
Wrapping
PACKAGING LOINS & RIBS
Fresh loin packing
Fresh ribs packing
BACON LINE
To hog cutting floor
Cut off hind feet and hams
Shoulder cut-off knife
Circular saw cuts off ribs
Cutting table
Split carcass in half
Loin-pulling
Belly roller
Pull ribs
2-cutting knives separate bellies from salt pork
Belly trimming
Belly grading
CASING RECOVERY
Pre-washing casings
Casing stripping machine
Casing washing machine
Casing receiving conveyor
To sausage dept.
Fat back or fat rendered into lard
Salt pork
PACKAGING BUTTS
PICNIC LINE
Fresh Boston butts
Picnics
Trimming, grading and packing
Trimmings to sausage dept.
Trimming
Jowls to sausage dept.
Picnic boning
Curing vat
To smoke house
LOAF GOODS
Bag stuffing table
Stuffer
Stuffing table
Smokehouse temp. controller
Chill room
CHUB ITEMS
Kettle
Stuffer
Roll of film
To casing
Chubbing machine
ING - PACKAGING
PACKAGING SLICED LUNCHEON MEATS
To slicing
Bologna products to slicing dept.
Slicing-stacking machine
rapping chine
8-head rotary vacuum pouch sealer
To casing, shipping
To casing, shipping
Packing table
8-head rotary vacuum pouch sealer
Window carton former
To casing
G & COOKING
SKINNING FRANKFURTERS
Banding machine
Bulk-packaging franks
Packing table
PACKAGING
Fresh sausage to packaging
Weiner skinner
16-oz. packages
Scales
CONSUMER FRANK PACKAGING
Cardboard flats
Wrapping machine
oker
Shower
Holding cooler
Weighing-packing table
Roll-fed film
To casing

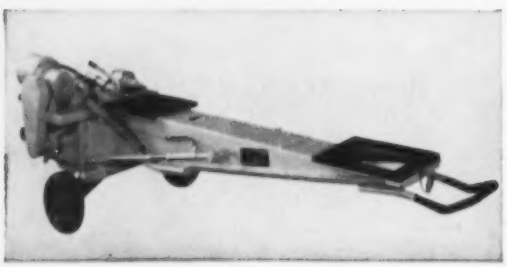


Do you see this from the office window of **YOUR BAKERY?**

If you don't, you should. To save yourself time, trouble, and money. For now, the most significant development between your bakery and bulk flour delivery is the new Fuller Airslide® Transfer Unit.

This unit greatly extends the field of application of both the Airslide bulk car and Airslide bulk flour van. The smaller bakery, as well as the large plants, can now enjoy the savings possible through handling of flour in bulk, whether or not the plant is located on a railroad siding.

Airslide bulk cars can be unloaded to Airslide bulk flour vans at team-track sites, for bakeries remote from railroad lines, the van delivering the flour direct to storage bins in the bakery. For the bakery located on a siding, the unit will deliver direct from Airslide cars to storage in the bakery.



This transfer unit is a unique combination of the F-H Airslide air-activated gravity conveyor and Airveyor® pressure type conveying system, wherein the flour is ideally fluidized by the Airslide for charging into the conveying system by the blow-through type of feeder.

To learn more about the Fuller Airslide Transfer Unit, send immediately for Bulletin TU-1. There are substantial savings involved.

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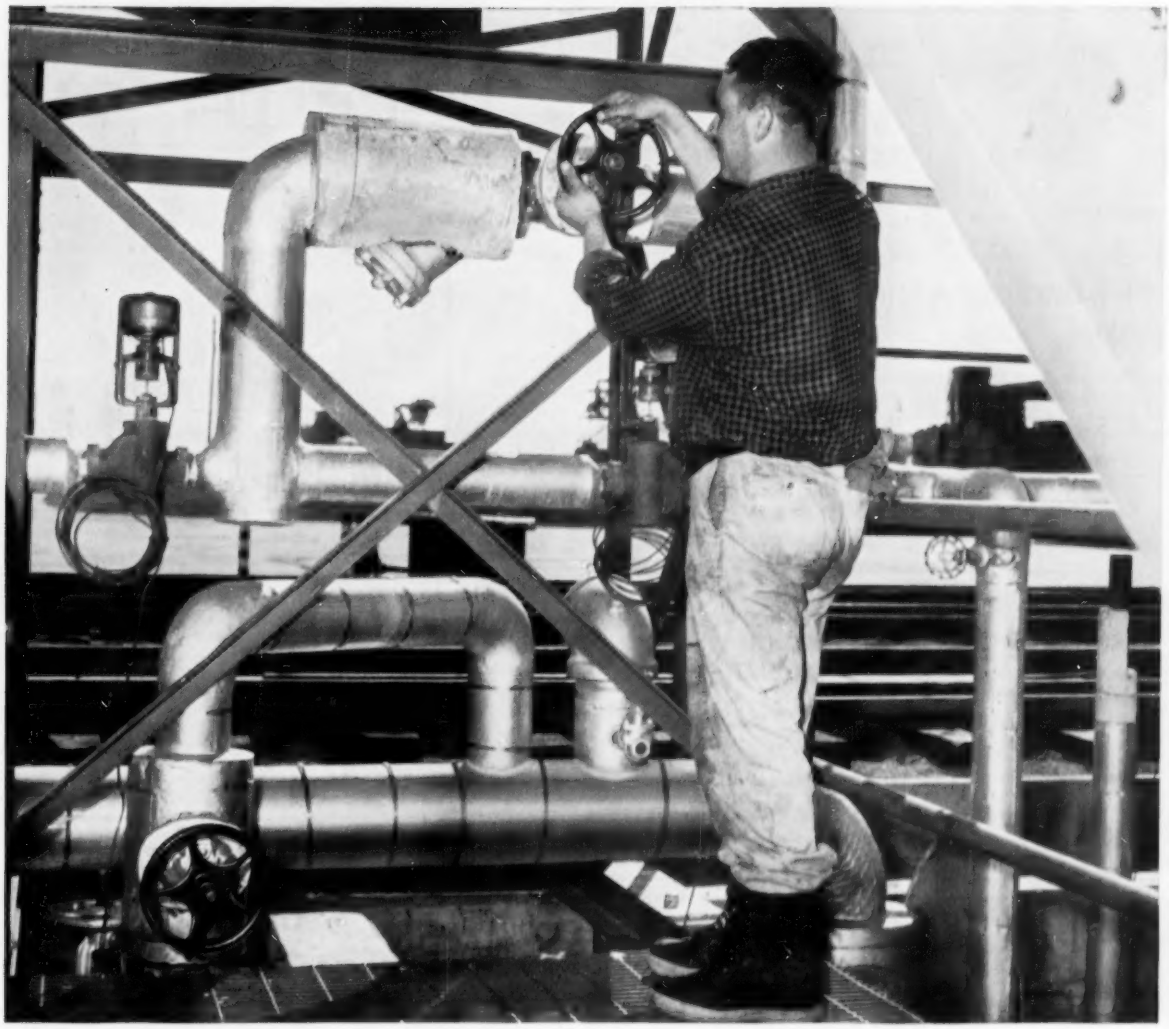


He not only washes tank cars... he doesn't contaminate them

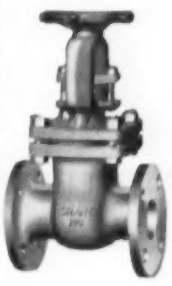
Even a good washer can contaminate a product tank car unknowingly—it all depends on the valves in the washing system.

But that doesn't happen at the Memphis emulsifiers plant of the Atlas Powder Co.

Here, Crane 18-8 SMo stainless steel valves are preventing corrosion and resultant iron pickup from getting into aluminum or stainless steel cars in washing. Such impurities could mean a lot of spoiled product when the cars are loaded.

After more than a year's service on hot detergent solution, the Crane alloy valves show no corrosive effects, and there's no record of damage from iron contaminants. With no maintenance whatever, the valves continue giving positive flow control.

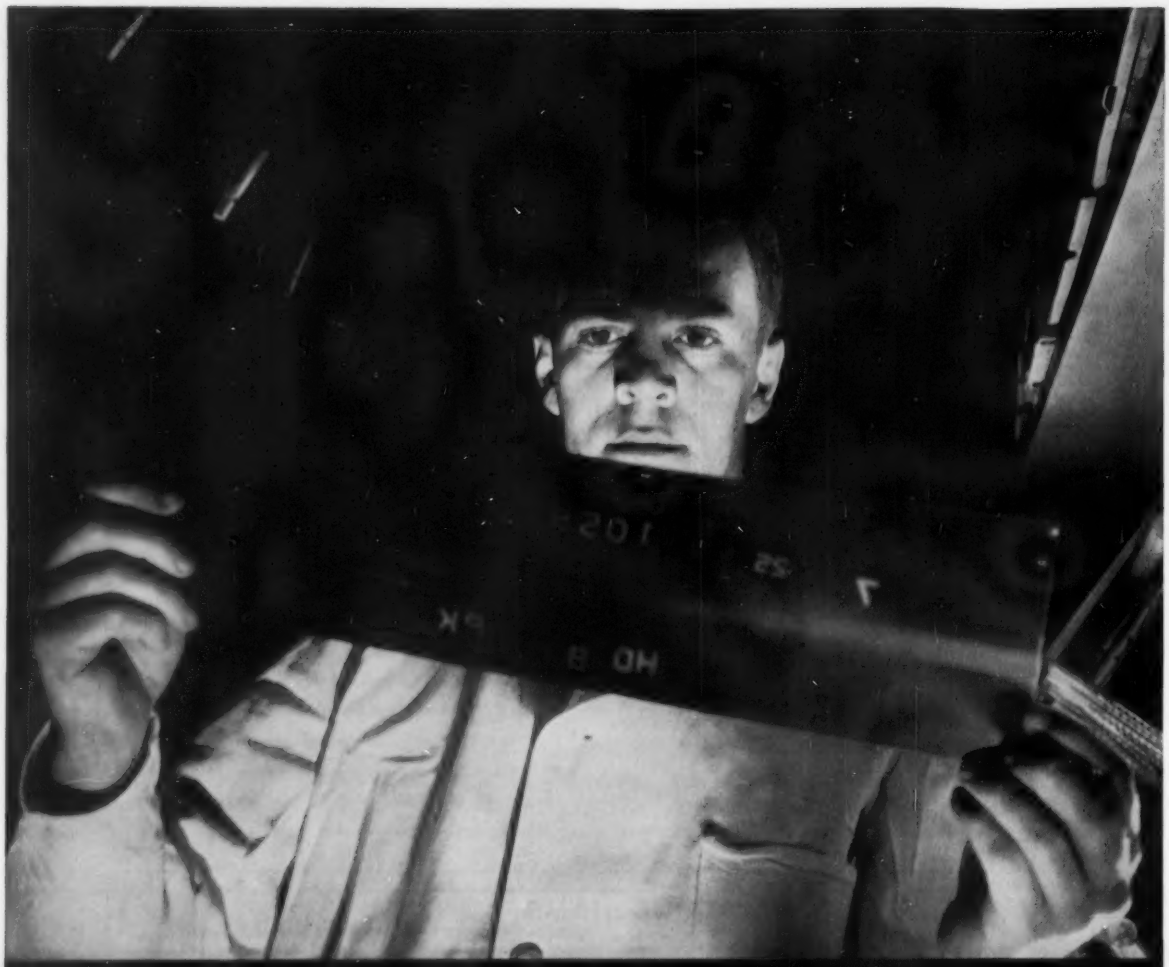
New Crane alloy valves are helping all types of process industries with better flow control and higher contamination corrosion resistance at low cost. They offer many service features that can't be duplicated. Get full information from your local Crane Representative or write to address below. Ask for circular AD-2080.



CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas



INSIDE STORY:

Why a Heat Exchanger Poses for an X-ray

This technician is giving a clean bill of health to a completed weld on a P-K heat exchanger. Like the x-ray of your chest, this x-ray picture is designed to pick up flaws before they have a chance to become harmful.

Pinholes, lamination, slag inclusions, and all other symptoms of failure are ruled out by this process, which is used to scrutinize the "inside" of *every weld*. Such radiographs are indispensible in manufacturing pressure vessels that will meet every test of time and use. Each x-ray is checked by a representative of the Hartford Steam Boiler Inspection and Insurance Company —for further insurance that every P-K heat exchanger meets or exceeds the rigid standards of the 1952 ASME Code for Unfired Pressure Vessels.

But weld x-rays at P-K represent only a *precaution*. They don't speak for the fact that all P-K welders are ASME qualified for a total of more than 50 types of welding procedures—meaning that the likelihood that flaws will occur at all is minimized. Nor can you see in an x-ray photo the incredibly careful design and calculation that goes into every P-K pressure vessel, to assure that it will be *thermally* and *physically* correct in every way.

Add this all-important knowledge of thermal design to P-K's fabricating and testing procedures, and you have what makes P-K heat transfer equipment different —and better—than all the rest.

Like proof? We'd be delighted to receive your inquiry. The Patterson-Kelley Co., Inc., 1570 Hanson Street, East Stroudsburg, Penn. Offices in principal cities.

Patterson Kelley

Chemical and Process Division

Twin Shell Blenders • Autoclaves • Pilot Plants • Heat Exchangers • Ribbon and Double Cone Blenders • Lever Lock Doors

EXPERIMENT NOW WITH SORBISTAT*

(Pfizer brand of sorbic acid)

*Trademark

● In extensive tests on a wide range of food products new SORBISTAT has proved an extremely effective antimycotic agent. It is a product that selectively inhibits the growth of many molds, yeasts and certain bacteria which cause spoilage.

Cheese and cheese products, pickles, fish, soft drinks, prepared gelatin fruit salads, potato salads, chocolate syrup and cakes are some of the foods in which the antimycotic action of sorbic acid has been evaluated. Reports indicate that in certain cases sorbic is several times as effective as other antimycotic agents now used commercially.

In retarding mold and yeast spoilage SORBISTAT does not affect appearance, taste, odor or, in the case of cheeses, normal microbiological curing. It is a stable, easily stored, white crystalline powder. You can add it to foods as a powder or as a solution of sodium sorbate.

You can now test the effectiveness of SORBISTAT in protecting the freshness of *your* food products. Send today for a free sample and technical information.

CHAS. PFIZER & CO., INC.
Chemical Sales Division
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Manufacturing Chemists for Over 100 Years

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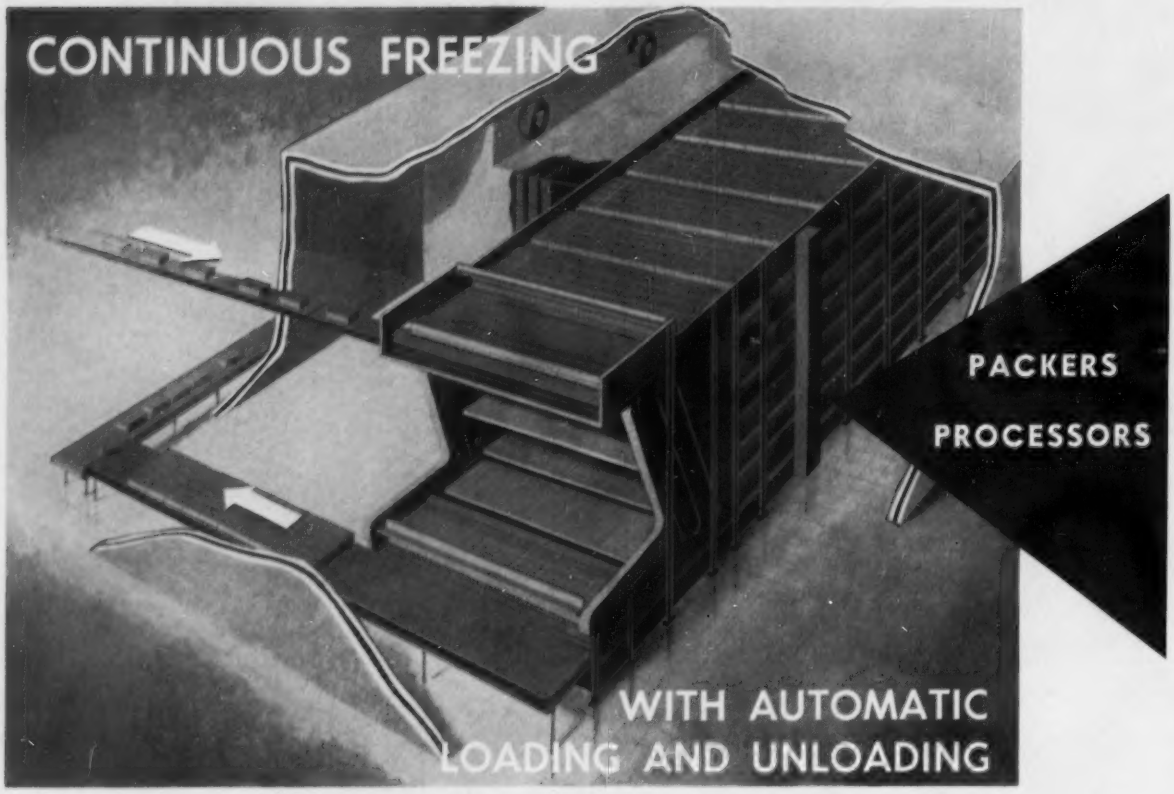
Please send me ☐ ½ lb. free sample Sorbistat
FE ☐ Data Sheet 510 (Uses of Sorbistat)
☐ Data Sheet 511 (Review of Sorbic Acid Literature)

Branch Offices: Chicago, Ill., San Francisco, Calif., Vernon, Calif., Atlanta, Ga., Dallas, Tex.



Compare the advantages

Announcing the Greer Multi-Tier Freezer for fish, meats, vegetables, ice cream and other food processing.

AMAZING SAVINGS IN FLOOR SPACE
Freezer illustrated packs over 31,000 sq. ft. of freezing area and 4 hours of freezing time in floor space only 10' x 64'. Variety of other models with even greater savings to match your plant and product requirements.

MAKES FREEZING A SIMPLE, CONTINUOUS PROCESS
A series of moving trays carry products through freezing cycle continuously, automatically. Increases manhour output.

FASTER, MORE UNIFORM FREEZING, TOO
Continuous motion plus open-tray construction insures positive air circulation — exposes products in each tray to absolutely uniform, controlled conditions.

A COMPLETE, PACKAGED FREEZING PROCESS
. . . engineered to your production requirements and building facilities. Complete refrigeration systems included.

TESTED . . . PROVEN
Actual installations prove GREER freezers make freezing fast, economical. Save space, boost quality control.

Write For all the Facts

J. W. GREER COMPANY

WILMINGTON, MASSACHUSETTS

Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.

GREER

NEW EQUIPMENT & SUPPLIES

Latest Equipment For Fruit Processors

Boosts Quality, Cuts Costs

Here are three fruit-processing units designed to improve quality, increase product yield, and cut costs. Maker is *Food Machinery & Chemical Corp., Canning Machinery Div., P. O. Box 1120, San Jose 8 Calif., or 103 E. Maple St., Hoopeston, Ill.*

Peach Peeler's Action Guards Quality, Reduces Caustic Consumption

First is a new peach peeler that handles halved fruit without subjecting either the cut side or pit cavity to the lye solution.

Result is greater product yield—up to four cases per ton—and lower operating costs through savings in caustic. Moreover, the unit (Cup-Down Peeler) can readily be adapted for peeling apricots. It is offered in four standard sizes from 25-60 tons per hr.

Increased yields were obtained in commercial runs during the '55 season, and fruit was protected from discoloration and disintegration of the flesh. Even tender fibers of the pit cavity retained natural appearance and color.

Operating costs are cut by preheating the lye solution in a heat exchanger. Thus, a lower concentration is needed for proper peeling, which reduces peeling loss. Furthermore, superheating permits flashing of a small amount of water from the solution as it is applied to the fruit to compensate for any dilution from steam condensation.

Additional savings are realized in water economy through use of a recirculating pump, storage tank, and cleaning screens. (109A)

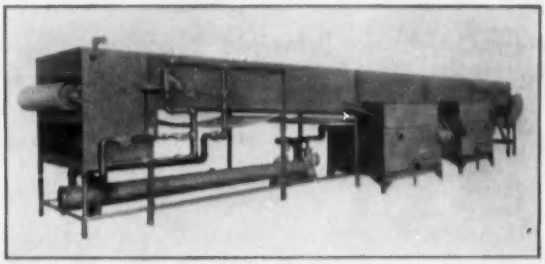
Pear-Preparation Unit Redesigned For Higher Efficiency, Versatility

Redesign of this machine promises greater yield of better-quality pears. Major modifications include a cup-feed mechanism, a straight butt-cut knife, and an expandable coring knife that offers an advanced processing technique.

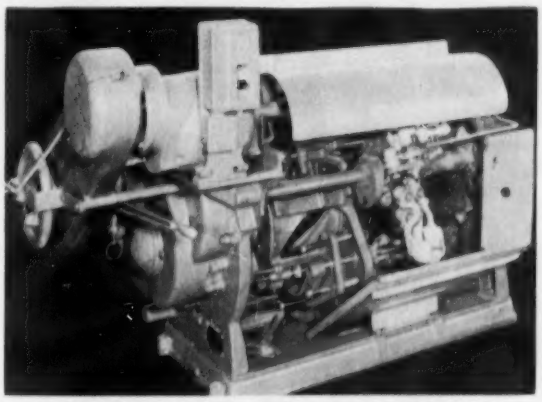
Symmetrical alignment of the fruit, which permits full machine capacity, is the principal advantage of the cup-feed mechanism. Formerly, proper alignment required some operator skill. But now, an unskilled operator can feed the pears expertly at 2,800-3,000 pieces per hr.—an average gain of 7%. Alignment is automatic after operator places fruit into cup stem down.

The straight-cut principle permits trimming the pear's butt end near the final stage of peeling, rather than at the beginning. Thus, peel can be left on the butt end to give the fruit greater strength during mechanical peeling. Result is greater product saving, particularly when fruit is soft.

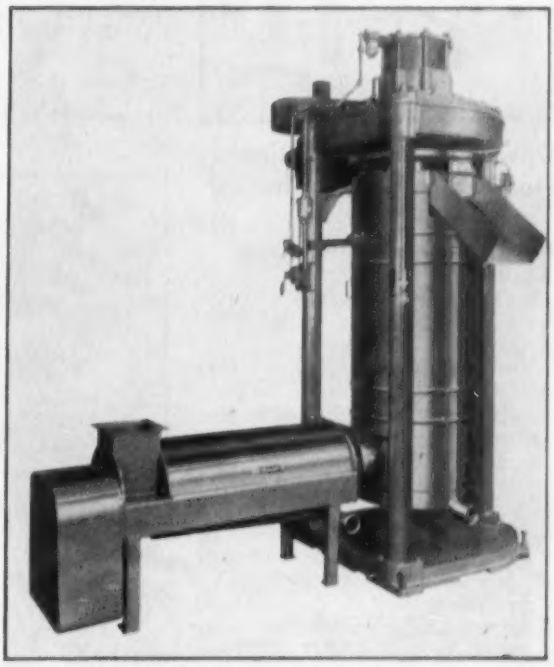
Advantage of an expandable coring knife is that whole fruit may be cored. For packers of fruit cocktail, this provides a greater percentage of whole cubes, and fewer



NEW PEACH PEELER increases product yield up to 4 cases per ton by handling fruit without subjecting the cut side or pit cavity to the lye solution.



PEAR-PREPARATION UNIT employs cup feed, straight butt-cut knife, and expandable coring knife for greater machine capacity, better quality.



VERTICAL SCREW PRESS has bottom feed screw and inverted cone that forms cake at top of cylinder to curb product channeling, loss of unpressed material.

slivers, than results from cubing of halved fruit. This method leaves only a ⅛-⅞ in. entrance hole. (109B)

New Operating Principle Reported For Vertical Screw Press

To handle a wider range of products and product densities, this press uses a new operating principle that eases formation of cake during startup. In addition, it eliminates product channeling to prevent loss of unpressed material.

Higher operating efficiency is attributed to two design innovations:

- Location of feed-screw mechanism at the bottom, rather than at the top, of cylinder.
- An inverted screw cone that conveys items to be pressed in an upward direction, forming the cake at top of screw.

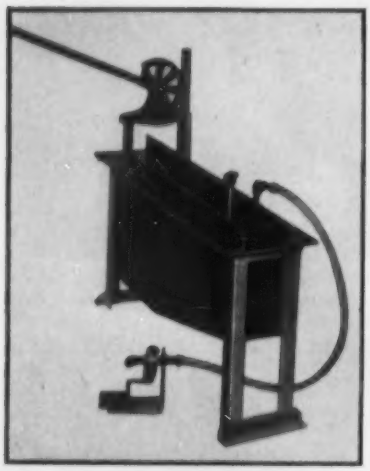
As a result, flow of juice is downward, past wetter pomance entering press. This prevents rewetting dry pomace with extracted fluid. Employing maker's backing screen, (Flo-Mor), unit offers up to 30% more draining area per square foot of surface for greater capacity.

Machine is designed to extract juice for further processing of the fluid, of the pressed pomace, or both. In recent plant tests on tomato products, juice was extracted from pulp for production of paste, puree, and catsup, with substantial savings from juice recovery and reduced handling costs reported. Pressed pomace was also recovered for use as cattle feed.

- **Other items tested include carrots, pineapple, prunes, pears, and orange peel.**

For ease of cleaning, press employs quick-opening locks that permit easy removal of all parts. Outer screen frames are hinged so that they may be swung wide open. The center spindle can be completely disassembled since flights and screens are built in quadrants, and are held in place by one quick-opening clamp. Finally, each section may be lifted out of the machine by opening the clamp that holds the quadrants. (109C)

Circle key numbers on Reader Service Card



Opens, Drains, and Rinses No. 10 Cans at 6/Min.

Here's a time and labor saver that enables one operator to open, drain, and rinse up to six No. 10 cans per min. Typical products: Syrups; pumpkin and tomato paste; whole, sliced, or diced fruits and vegetables.

The unit (HP Can Opener-Rinser) employs a pyramid-shaped bit that opens four triangular flats in the can bottom. A pierce-and-pull motion eliminates metal slivers as cans' contents drain through a 3-in. opening into a 27-gal. reservoir. Rinsing is done with a foot-operated valve having 5 spray nozzles. All parts contacting the product are stainless steel.

Available without the drainage tank, if desired, and to accommodate other can sizes, unit is 24x48x13¼ in., weighs 200 lb.—*F. H. Langsenkamp Co., 235 E. South St., Indianapolis 25, Ind.*

Circle 110A on Reader Service Card

Electronic Potentiometer Transmits Process Data

Equipped with a pneumatic transmitter, a new potentiometer sends a 3-15 psi. signal (proportional to the measured variable) to remote indicators, recorders, or automatic controllers.

Known as Dynamaster, unit is available in either potentiometer or bridge circuits to measure any variable that can be translated into an electrical quantity. Typical data—flow, pressure, temperature, viscosity, pH, smoke density, and speed. Instrument is available with or without an indicating scale.—*The Bristol Co., Waterbury 20, Conn.*

Circle 110B on Reader Service Card

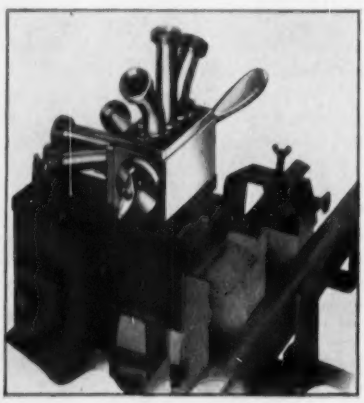
Glove's Tread Design Aids Gripping of Wet Items

Improved handling of wet slippery materials (as in a cannery) is reported for a new tractor-tread glove of natural latex.

Called Canner's Gloves, their integral herringbone tread is said to provide a strong grip without materially affecting sensitivity. Fingers are curved for comfort.

Gloves are made in gauntlet style only and in small, medium and large sizes.—*Surety Rubber Co., Carrollton, Ohio.*

Circle 110C on Reader Service Card



3-Flavor Bypass Valve Cuts Packaging Loss

For greater flexibility on ice-cream packaging lines, this new 3-way valve easily bypasses three flavors without waste.

Designed for use with maker's Model 175 automatic packager and the Model 393 (Extru-Wrap), it keeps each flavor separate when bypassing. The nozzle-flange assembly is interchangeable with inlet unit, and valve is easily attached or removed from a machine. Sanitary construction permits quick disassembly for cleaning.—*Anderson Bros. Mfg. Co., Rockford, Ill.*

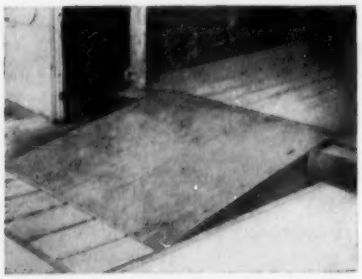
Circle 110D on Reader Service Card

Kit Converts Lift Trucks To LP-Gas Operation

All makes of industrial lift trucks may easily be converted to LP-gas operation in 3-4 hr. with use of a new pre-assembled kit designed to highest safety standards.

Known as Hendrix Conversion Kit, its parts are clearly identified. Lines, fittings, and carburetion assembly are mounted for bolt-on arrangement. Kit comes with fuel-cylinder bracket, toggle and strap to hold cylinder in position, and location pin to carburetion linkage.—*Industrial Gastruck, Inc., 2019 Dempster St., Evanston, Ill.*

Circle 111A on Reader Service Card



Truck-Loading Time Cut By Adjustable Ramp

Board-placement loading and unloading time may be cut 80% by a new steel dock ramp that adjusts to truck tailgate heights and carries a 10,000-lb. load.

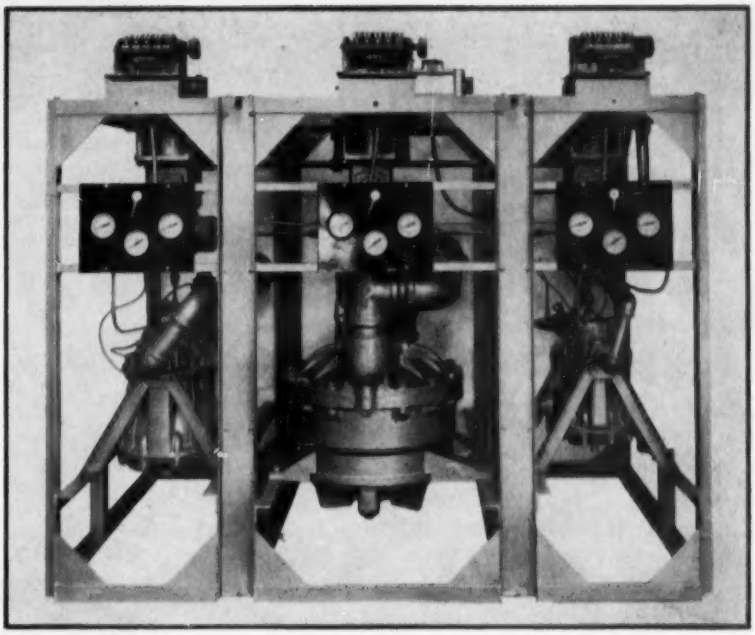
Easily installed and operated, its flexible construction allows the ramp to float as loads are moved on or off trucks. One man, using a small handle, can move the counterbalanced 60x60 in. loading plate into working position. When not in use, ramp sets flush in dock to allow unrestricted traffic over its surface.—*Frisch Corp., 1400 Wabansia Avenue, Chicago 22.*

Circle 111B on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—front of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.



Permits Continuous, Accurate Batching of Liquids

Here is an accurate, automatic liquid-blending system designed to cut costs by converting batch operations to continuous. Numerous variations of blends are possible, since each unit can be set to deliver in increments of ½%, from ½ to 100%.

Known as Xacto Blending System, it offers simplified handling, reduced pumping, elimination of gaging, and manual drawing of samples. There is a further saving in tank investment, space, and maintenance, since mixing tanks are unnecessary. Furthermore, handling of liquids in a closed system avoids loss, also guards product uniformity and quality.

System is enclosed in a cabinet (not shown) consisting of individual front and end panels. It may be supplied with almost any number of meters from two up, hence can be expanded to meet future needs. Selector and indicator dials are conveniently accessible under hinged covers. Dial numerals, inlet and outlet pressure gages, thermometers, and control-valve positioning pointers are easily visible through glass-covered panels on the front. The open back can be closed and vented if necessary.

In operation, selectors are set to the percentage of ingredients in the blend. When pump is started, liquid flows through a control valve into each meter. Flow of liquid turns meter shafts to drive differentials and vertical square-end shafts that rotate control nuts. Latter are threaded to permit moving up or down on a threaded shaft connected to the bottom of selectors.

Should flow to any meter be retarded, the nut moves a lever to open control valve of a respective meter. If liquid supply fails, further motion of the lever operates a switch to stop all supply pumps.—*Bowser, Inc., Fort Wayne, Ind.*

Circle 111C on Reader Service Card

Inert-Gas Generator Uses Special Burner Control

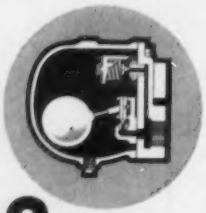
Designed to meet recent developments in processing of food in oxygen-free protective atmosphere, this inert-

1 Sarco TD Thermodynamic Steam Trap

Self-adjusting for 10-600 psi ...no head or seat change or adjustment... Practically no maintenance: 1 moving part ...stainless steel disc. Only 3 parts: cap, body, disc. All stainless steel. Cat. 257.

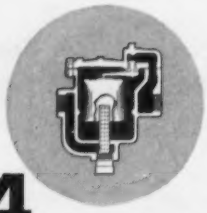
2 Sarco Balanced Pressure Thermostatic

Greatest capacity per dollar cost. Large air venting capacity. Same head and seat, 0-300 psi. Freeze-proof. Cat. 250-A



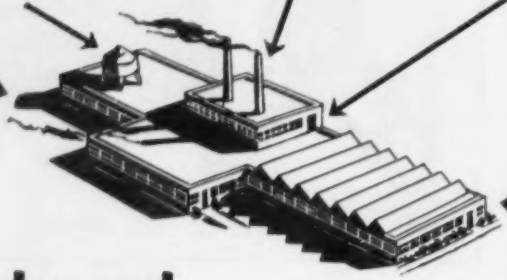
3 Sarco Float-Thermostatic

Discharges condensate continuously at steam temperature and without shock. Responds immediately to varying loads and pressures. Cat. 450-A



4 Sarco Camlift Bucket

New, powerful Camlift valve mechanism permits greater discharge with no increase in size of trap body. Cat. 360-A



5 Sarco Liquid Expansion

Adjustable to discharge condensate BELOW 212°F. Freeze-proof. Not affected by water-hammer or pressure pulsations. Cat. 260-A.

How to get efficient steam trapping ...throughout your plant

With these *5 Basically Different* Types of Sarco Steam Traps you can select the trap with the characteristics that match your *specific* job conditions.

Just because a steam trap discharges condensate and air and closes to steam doesn't necessarily mean it's doing a good job. For maximum efficiency, a trap must also keep conditions within the steam spaces right for the heat transfer job to be done.

For example: A Bucket Trap will work on a unit heater—but its discharge is intermittent. Between discharges, condensate collects in the small steam space of the heater causing undesirable changes in air temperature. The continuous discharge Float-Thermostatic Trap will, however, keep the heating surface free from condensate *all the time*—insure uniform air temperature.

That's why no one type of steam trap can give best trapping results under all job conditions. And that's exactly why Sarco makes 5 *basically different* types of steam traps—each with a different set of operating characteristics.

Solve Your Trapping Problems

And because Sarco makes all 5 types—not merely variations of one type—you can always get *impartial* advice from Sarco, based on over 43 years of field experience. Write to your local Sarco representative or to Sarco Company, Inc., Empire State Building, New York 1, N. Y.

ONLY SARCO makes all 5 types of steam traps

—not merely variations of one type!

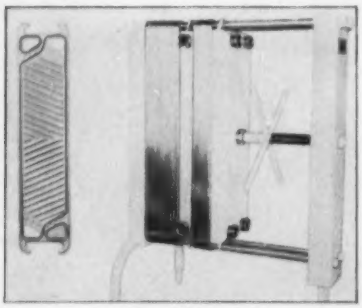
2193-B

gas generator employs a special control for constant and efficient combustion. Applications for the compact unit (S. I. A.) include storing of products in bulk, dehydration, and packing in metal, glass, or plastic containers.

In operation, flow of fuel into an air-fuel mixer is governed through a fixed orifice by two pressure regulators arranged in series. Adjustments are easily made by changing the pressure above orifice. This method eliminates supply-line fluctuations and provides better fuel regulation.

In addition, an air-temperature controller furnishes a constant weight of air to the burner. Average cost of operation is 8-10 c. per cu. ft. Operation and maintenance of the unit are termed simple.—*W. F. & John Barnes Co., Food & Container Section, 301 S. Water St., Rockford, Ill, or Barmotive Products, Inc., San Leandro, Calif.*

Circle 111D on Reader Service Card



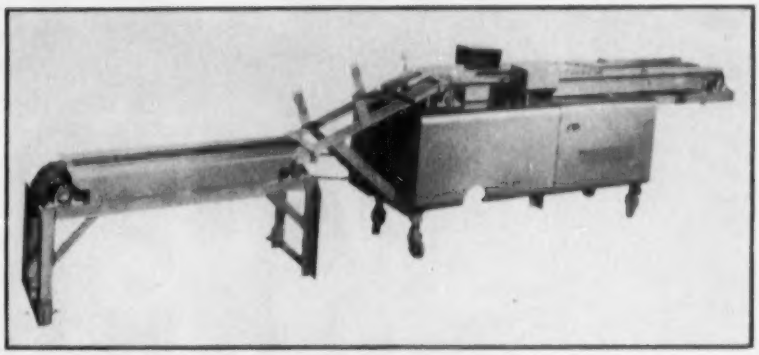
Many Advantages Noted In New Plate Exchanger

In processing fluids such as dairy products or juices, this plate exchanger is said to handle any job from HTST pasteurization through heating and cooling. Moreover, it offers efficiency of regeneration, total enclosure for sanitation, and compactness.

Known as Series "C", unit incorporates maker's special plate (Zig-Zag Flow) for increased heat transfer over batch or open-flow methods. Versatility is another plus factor. Its capacity can be increased or decreased to suit the need, or entire unit can be shifted to a different job in the plant, as from heating to cooling.

Other advantages cited: Stainless-steel terminal frames with four 2-in. stainless sanitary thread port fittings, adjustable ball seat, rust-proof and painted easy-to-clean finish.—*Kusel Dairy Equipment Co., Watertown, Wis.*

Circle 113A on Reader Service Card



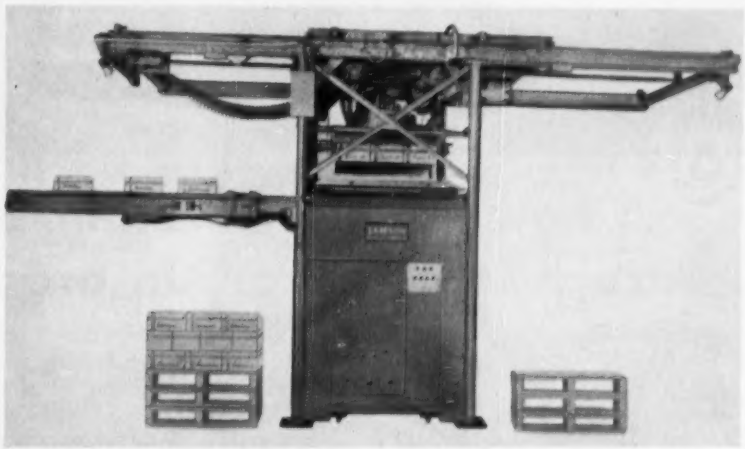
No. 10's Efficiently Cased By "Open-End" Packer

Here's a new case packer for No. 10 cans designed to boost efficiency and cut costs. Known as Model 10, it combines the economy of open-end packing with simplicity of design and operation, and high-speed production.

In operation, cans travel upright past a divider that separates them into two equal lanes. Special star-wheel timing pawls pass three containers through each lane, then lock into position to keep following cans in place on the conveyor. The six cans, allowed to pass through, slide down an incline into open end of carton. Operator tilts carton to an upright position on take-away conveyor to finish the job.

Other advantages cited: Savings in carton costs, no tearing or distortion of labels, and no rolling or bumping to damage product or container.—*Manitowoc Engineering Corp., Manitowoc, Wis.*

Circle 113B on Reader Service Card



New Unit Permits Economical, Low-Speed Palletizing

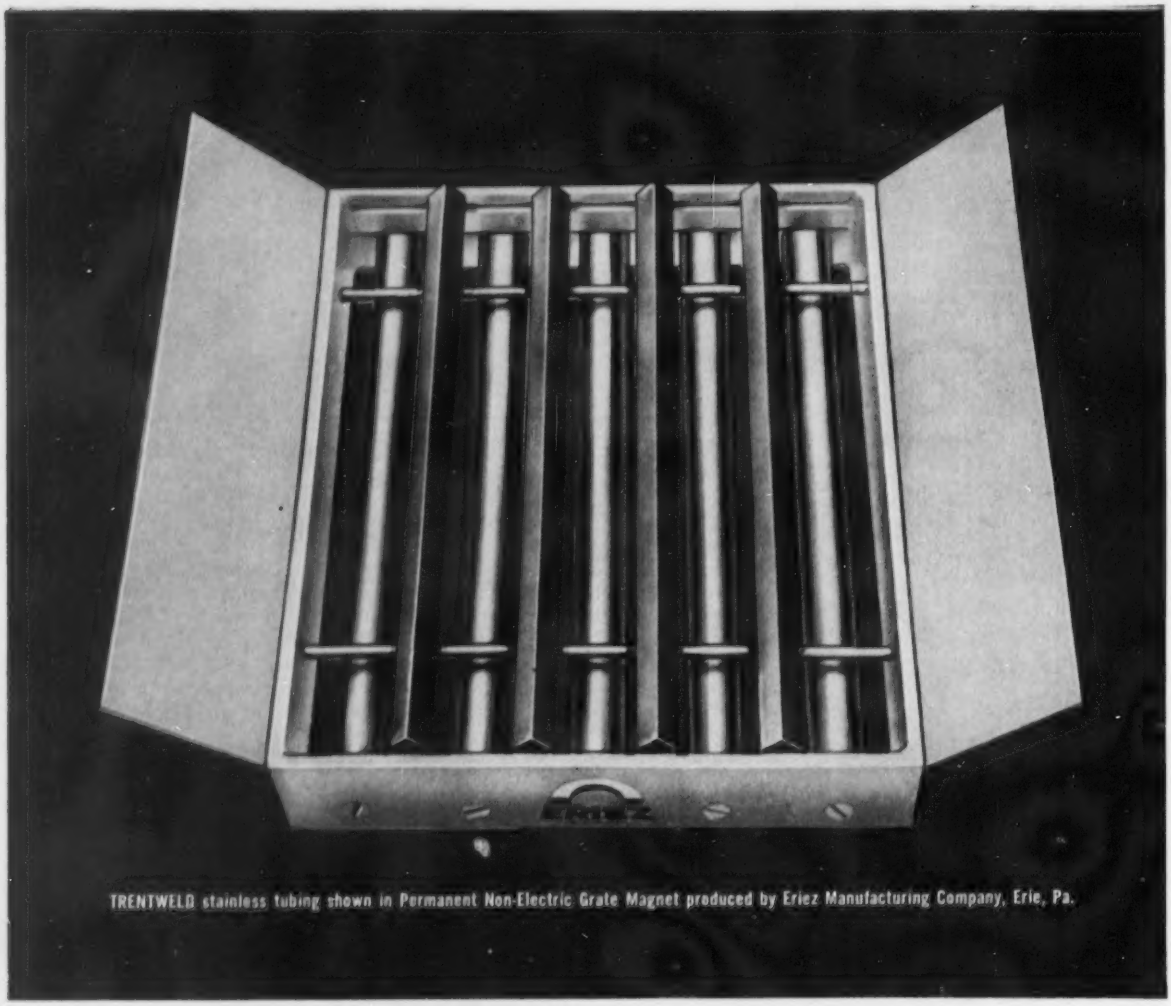
The processor whose moderate production rate precludes the use of a high-speed palletizer will be interested in a new low-capacity, fully-automatic pallet loader.

Called Model "G," it handles about 20 cartons per min., but can be justified at a capacity as low as 5 per min. Unit takes pallets up to 48 in. with a maximum load width, including overhang, of 52 in., and maximum length of 50 in. It can be loaded with pallets one at a time or in stacks.

Weight of a load on a pallet is not limited by the machine, since pallet sets directly on the floor. Weight of a layer of cartons is limited to about 600 lb., but can be increased with moderate revisions. At present, loader is designed to handle sealed cartons with top diagonal dimension not exceeding 21 in.

Its operation is similar to that of conventional high-speed machines. This loader employs 7 electric motors and requires about 2 cfm. of air at 60-80 psi.

Unit can be adjusted to handle a



TRENTWELD stainless tubing shown in Permanent Non-Electric Grate Magnet produced by Eriez Manufacturing Company, Erie, Pa.

how TRENTWELD stainless tubing traps "tramp iron" in product flow...

As free-flowing products such as chemicals, grains, sugar or spices flow through this separator unit, large and small iron contamination is seized by powerful magnets and held firmly to the five stainless steel tubes.

This is a unit that's normally given long, hard use. That's why TRENTWELD stainless steel tubing is chosen to house the Alnico V magnetic elements. For stainless resists abrasion and corrosion . . . its smooth surface offers a minimum of resistance to product flow . . . and stainless is strong—lasts indefinitely. What's more, stainless is the easiest of metals to keep clean and sanitary.

And equally important to you is the fact that TRENTWELD is made by *tube mill specialists*—by the new, patented *Contour-Weld** Process. That means stainless pipe or tubing with a smoother I.D., free from any weld bead or undercut.

So when you need stainless or high-alloy pipe or tubing, make sure it's TRENTWELD. You can't buy better!

TRENTWELD

STAINLESS STEEL TUBING

*Contour-Weld is the trade mark of the Trent Tube Company for its processes of welding pipe and tubing which is protected under U. S. Patent 2,716,692.

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

different size carton by changing the grid of the pickup head. Changeover takes about 5 min. Each interlocking pattern is controlled by a cartridge, several of which can be mounted in a control panel. Thus, a pattern can be changed by pushing a button to energize a different cartridge.

The grid is a perforated metal sheet with sponge-rubber strips adapted to a particular carton layer. They fit over voids between cases and form an edge around the outside of the layer. Resulting seal permits forming of a vacuum on top of cartons.—*Lamson Corp., Syracuse 1, N. Y.*

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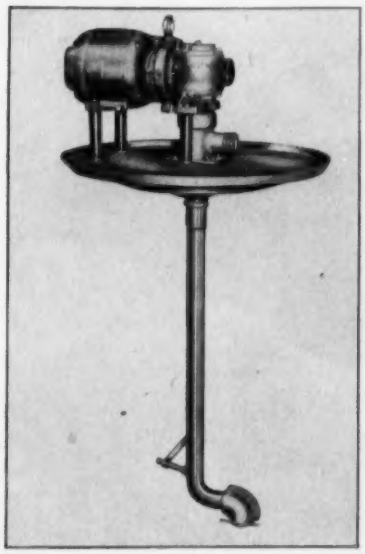


New Tank-Truck Washer Eliminates Hand Labor

Costly cleanup time for milk-transport trucks may be cut to minutes with use of this new washer. Furthermore, it eliminates hand labor and leaves tank interior free of scratches which harbor bacteria.

Motor-driven unit (Circulating Tanker Washer) delivers 65 gpm. of cleaning solution at 45 psi. Two jets on a revolving head spray solution over entire upper half of tank. One jet delivers in a broad fan-shaped pattern that reaches from manhole to tank ends.

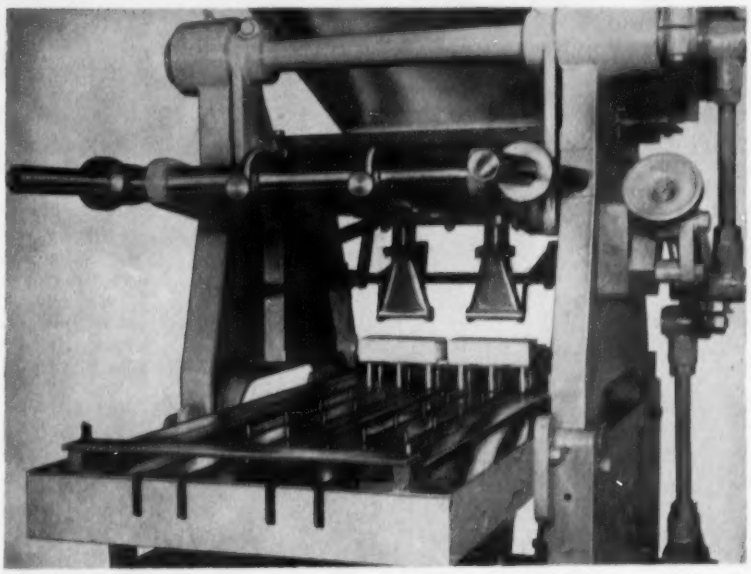
Second jet, on opposite side of head, shoots a stream to all upper radii to cover every interior part. Solution then cascades down sides of tank to clean all surfaces.—*Girton Mfg. Co., Millville, Pa.*

Circle 115A on Reader Service Card

Heavy-Duty Truck Line Offers "Quick" Power

The truck that's pulling this semi-trailer is one of a new "V" line consisting of conventional and cab-over-engine models. Four-wheel and six-wheel units, ranging upward from 24,000 lb. GVW and 50,000 lb. GCW, offer cab and chassis improvements for greater comfort and easier steering. Trucks are powered by new heavy-duty V-8 engines designed for greater flexibility and to move heavy loads at today's traffic pace. Engines are rated at 206, 226, and 257 rp.—*International Harvester Co., 180 N. Michigan Ave., Chicago 1.*

Circle 115B on Reader Service Card



Fills Processed Cheese Into ½-to-5-lb. Units

For greater accuracy in filling cartons with processed cheese, this machine uses the bottom-up method which eliminates air pockets. Speed is up to 40 per min.

Unit has a hot-water or steam-jacketed hopper. A separate motor-driven scraper and vertical mixer-type agitator keep product from sticking to hopper sides. Agitator also forces cheese into filling tubes for faster operation.

All contact parts are of stainless steel and Monel. Special cutoff manifolds are available for filling small or large boxes, and changeover for different size containers is quick and easy.—*The Filler Machine Co., 10 Penn Ave., Rockledge, Philadelphia 11.*

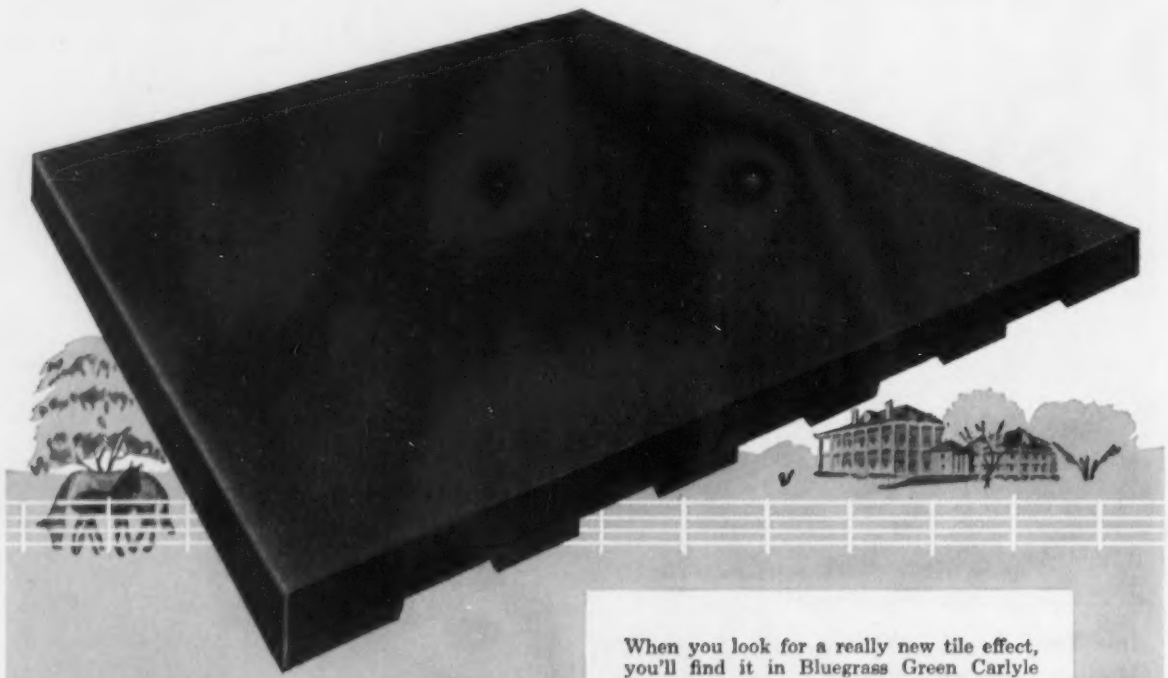
Circle 115C on Reader Service Card

Only Mosaic offers you *green* Carlyle Quarry tile . . . Bluegrass Green . . . a beauty in itself or combined with your choice of other Carlyle Quarry tile colors.

Now! Bluegrass Green Carlyle Quarry Tile

...the *New* color in Quarry tile!

This versatile new Bluegrass Green tile performs on the job as dependably as all Carlyle Quarries. Won't fade or wear under hard use. Vitreous. Requires an absolute minimum of maintenance. Sizes: 6″ x 6″, 6″ x 2¾″, 4″ x 4″ and 2¾″ x 2¾″. All sizes are ½″ thick. Limited selection of trim shapes. Installed cost somewhat higher than other Quarry colors.



When you look for a really new tile effect, you'll find it in Bluegrass Green Carlyle Quarry tile. It's a product of Mosaic. For your copy of the Carlyle Quarry Tile Catalog, write Dept. 25-4, The Mosaic Tile Company, Zanesville, Ohio.

Most colors and sizes of Carlyle Quarries are readily available. Ask your tile contractor or Mosaic representative for details.

Carlyle Quarry Tile . . . the only complete line of quarry tile

a product of

THE MOSAIC TILE COMPANY

America's largest manufacturer of ceramic floor and wall tile

Member—Tile Council of America and The Producers' Council, Inc. Over 5000 Tile Contractors to serve you

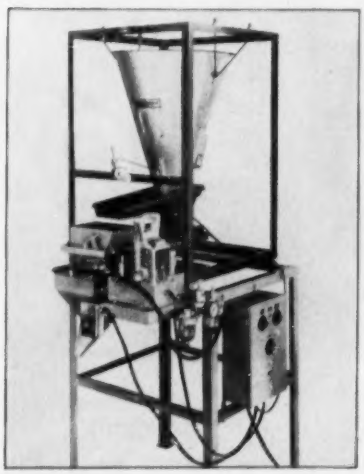
Showrooms, Warehouses and Factories from Coast to Coast . . . **WAREHOUSES & SHOWROOMS:** Atlanta, Baltimore, Boston, Chicago, Corona, Calif., Dallas, Denver, Detroit, El Segundo, Calif., Fresno, Greensboro, Hartford, Hempstead, L.I., N.Y., Hollywood, Ironton, Little Rock, Matawan, Miami, Minneapolis, New Orleans, North Hollywood, Philadelphia, Portland, Rosemead, Calif., Salt Lake City, San Diego, San Francisco, Seattle, Tampa, Washington, D.C., Zanesville. **SHOWROOMS:** Milwaukee, New York. **REPRESENTATIVES:** Buffalo, Cincinnati, Kansas City, Oklahoma City, Pittsburgh. **FACTORIES:** Zanesville & Ironton, Ohio, Matawan, N.J., Little Rock, Ark., Jackson, Miss., Corona & El Segundo, Calif.

Quick-Connect Coupling Is Corrosion Resistant

Extreme resistance of a new quick connect-disconnect coupling to corrosion in transfer of acids, alkali, solvents, or high-pressure steam is attributed to use of Teflon seals throughout.

Known as "HK", it has an operating range of −100 to 500F., and can be subjected to lower or higher temperatures for short periods. Units are supplied without valves or with automatic shutoff valves in either or both ends. Available in stainless or other metals, couplings range in size from ½-3 in. i.d.—*Snap-Tite, Inc., Union City, Pa.*

Circle 117A on Reader Service Card



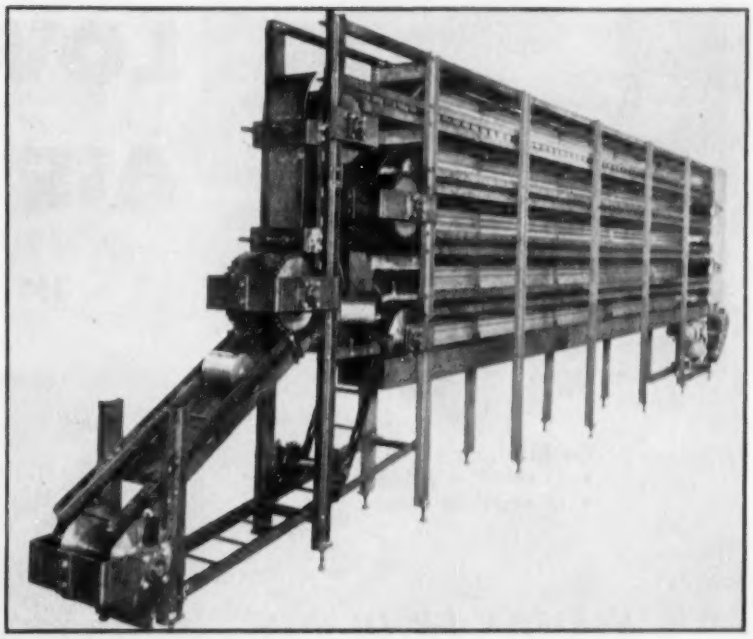
Packaging, Batching Sped By Efficient Net Weigher

A fast-responding lever system, two rates of feed (each fully adjustable for bulk or dribble feeds), and fast weigh-hopper discharge, particularly suit this automatic net-weighing machine for packaging, sacking, or batching.

Called 610 NW, capacity of the small-capacity model is up 3 lb. The larger one handles products in the 3-10 lb. range. Units incorporate an even balance (1:1 ratio) precision scale with visual indicator, net-weight hopper, and automatic cutoff controls.

An over-under indicator for visual checking eliminates need for separate checkweighing. Calibrated adjustments with counterweights of known value, graduated beam and poise, and scale indicator further simplify operation. —*Exact Weight Scale Co., 944 W. 5th Ave., Columbus, Ohio.*

Circle 117B on Reader Service Card



Combined Pasteurizer-Cooler Cuts Process Time

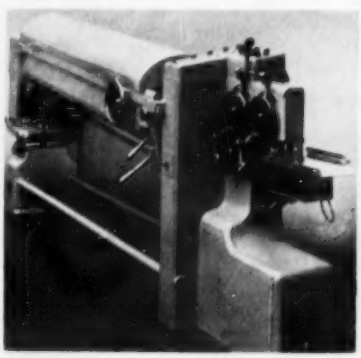
If your product is packed in a round container and can be slowly rolled without injury, this combination pasteurizer-cooler may cut its processing time to one-third. Items efficiently treated in the unit (Roll-Thru) include tomato products, pastes, purees, juices, jams and preserves, fruits, some vegetables, and carbonated soft drinks.

Machine handles the product gently. Rotation of the container is very slow and its direction changes when can drops from one runway to the one below. This prevents product from adhering to and stratifying on inner surfaces of container—extremely important to rapid heat transfer and product quality. Each can is separately controlled and does not contact any other.

Unit can be fitted as a cooler with maker's evaporative system, or as pasteurizer with maker's hot-water system, or as a combination cooler-pasteurizer. Minimum floor space is required since machine occupies height rather than width. It can be located in a hallway with a high ceiling, or even outside the building.

Equipment handles a wide range of container sizes (tin and glass), and is quickly adjusted from one size to another. Completely sanitary, it has no sumps or other inaccessible spots where microorganisms can germinate. Washdown is quickly accomplished with a steam hose.—*Canning Machinery Co., P. O. Box 505, Glencullen, Ore.*

Circle 117C on Reader Service Card



Rolling and Sizing Offered In One Confectionery Unit

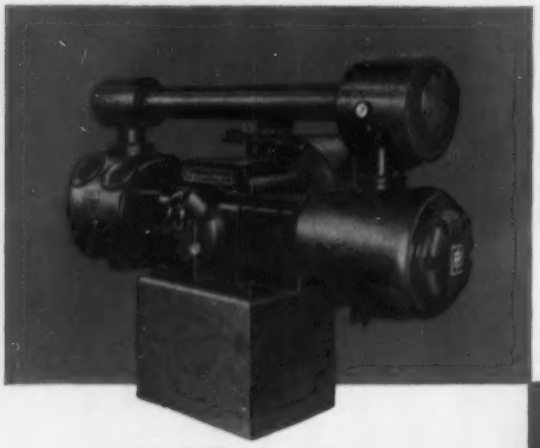
With sizing rollers of this new batch roller mounted vertically, sugar rope is carried through the rollers rather than being pulled. Result is precise sizing for all rope consistencies. Known as Model SFA/ASR, unit's sizing station is integral with the machine. Up to six pairs of sizing rollers may be used, with pairs added or removed as required.

Machine has six conical rollers that

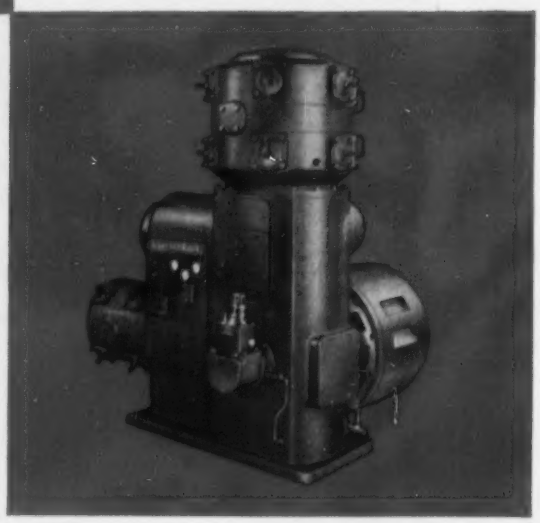
TWO READY-TO-RUN COMPRESSORS FOR

LOW-COST AIR POWER

IN YOUR SHOP



the PHE
- 75 and 100 hp packaged
- Opposed-piston balanced design



the XLE
- 125 to 250 hp packaged
- 300 and 350 hp with engine-type synchronous motor
- Thru-frame air flow

Why MODERN I-R DESIGN can reduce your air power costs and increase your production

Built tough for continuous full load, and refined for efficient performance at all loads.

Packaged, ready to run, each unit completely self-contained with crankshaft-mounted motor. Units up to 250 hp are shipped fully assembled, ready to hook up.

Full-floating aluminum bearings are foolproof, never need adjustment. They "roll with the punch" of every compressor stroke. Wear is distributed evenly around both inside and outside.

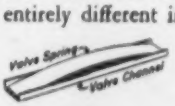
Closed crankcase never has to be opened for bearing adjustment, so dirt (the major cause of wear) is kept out of the oil.

Two-stage, intercooled compression, with I-R cylinders of proven design, makes most efficient use of horsepower.

Exceptionally smooth running balance permits small, simple foundation.

Compactness permits installation in small areas, requiring less of your valuable shop space.

CHANNEL VALVES give quiet, trouble-free operation and amazing long life due to air-cushioned action and reversible seat plates. Known all over the world for their efficiency, these valves are entirely different in design and principle from any other valve ever used. Channel valves are available only in I-R compressors.



Ingersoll-Rand

1-381 11 Broadway New York 4, N. Y.

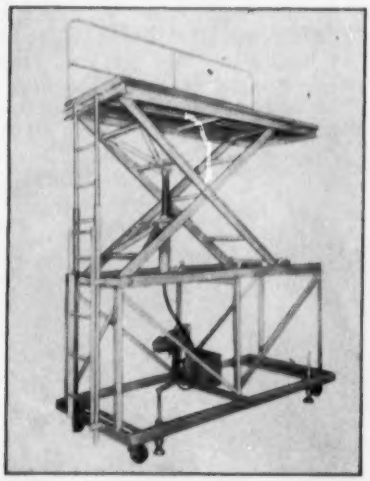
COMPRESSORS • CONDENSERS • AIR AND ELECTRIC TOOLS • TURBO-BLOWERS • PUMPS ROCK DRILLS • GAS AND DIESEL ENGINES

keep the batch in continuous motion by reversing the rolling action every nine revolutions. It may be heated by electricity, gas, or steam. A filling tube can be inserted whenever filled goods are made.

Speed of feeding sugar rope to next operation, such as plastic forming, is regulated automatically. A control starts the sizing action whenever the station accumulates surplus rope. It does not, however, interrupt rolling action.

Unit handles any batch up to 120 lb. Rope speed can be adjusted from 25-150 fpm. Space required for a machine with two sets of sizing rollers is 20 x 137 in., with each additional set of rollers adding 8 in. Machine is distributed in the U S and Canada by *C. Tennant Sons & Co., 100 Park Ave., New York City 17.*

Circle 117D on Reader Service Card



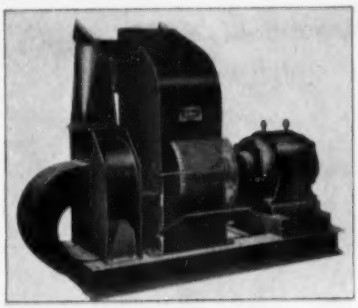
Affords Safe Work Area Above Ground Level

Greater safety and convenience for production and maintenance work above ground level is the aim of this unit.

Known as Hydraulic Lift Work Platform, its flexibility and portability eliminate need for scaffolds. Platform is 5 ft. above floor level in its lowest position, and can be raised an additional 10 ft. Power is supplied in any of three ways: By ¼-hp. electric motor; self-contained, battery-operated motor; or hand pump. Double rack and pawl holds platform at working height, and access to platform is by a telescoping ladder located at one end.

Platform size is 33 in. x 7 ft. 8 in., rated load is 1,250 lb. An expanded-steel cover provides a firm footing and curbs accumulation of dirt or oil. Further protection is given by a 3-ft-high handrail along the 8-ft. side.— *Ballymore Co., Wayne, Pa.*

Circle 119A on Reader Service Card



Versatility, Speed Cited For Hammer Grinder

Said to handle anything grindable, this hammer grinder can reduce and pulverize foods to any degree of fineness—quickly and with low power consumption. Typical products: Apples, bread, citrus pulp, coco-bean, fish scrap, gelatin, peanut and rice hulls, and all grains.

Unit (Duplex) grinds in mid-air as swinging hammers, of abrasion-resistant alloy steel, repeatedly strikes suspended material. Latter then passes through perforated steel screen. Grinding is cool and uniform as friction is minimized.

Arc-welded construction is used throughout. The steel-plate body is mounted on a structural-steel base. Self-aligning ball bearings are employed, and all wear points are specially reinforced. Hammers can be reversed for longer life and screens may be changed in about 30 sec. without removing mill cover.

Units with direct-connected motor or belt drive are available in five models—throat openings from 12-24 in., motor range from 30-150 hp.— *The Duplex Mill & Mfg. Co., 728 Sigler St., Springfield, Ohio.*

Circle 119B on Reader Service Card

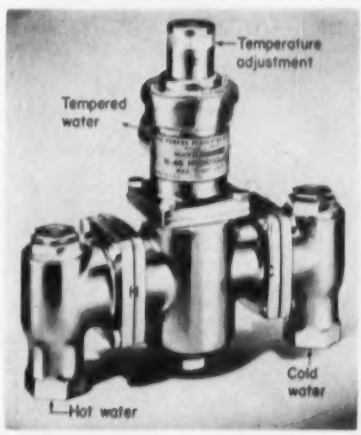
New Thermal Cable Offers Convenient Heat Source

Controlling the viscosity of fluids is a particular application for a new electric heating cable. It provides a convenient and accurate method of applying or maintaining heat in pipes, vats, or irregular objects.

Called Silicone Thermwire, unit employs nichrome resistor wire plus the heat resistance of a silicone rubber to permit continued temperature of 275F. It offers high dielectric strength, excellent resistance to moisture, and good corrosion and abrasion qualities. Heat output depends on length of wire used and spacing between coils when wrapped around vats or pipes. Automatic temperature control is obtained by use of a thermostat or percentage-input controller.

Easily installed, cable can be used on 110 or 220v. a.c. or d.c., and is available in minimum lengths of 60 ft., or as a 400-ft. reel.—*Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8.*

Circle 119C on Reader Service Card



Accurate Water Mixer Prevents Self-Failure

Through triple-safety protection, this accurate water mixer offers foolproof control of water temperature. Capacities are 45 and 125 gpm.

Called Type N Hydroguard, it automatically shuts the hot-water port if cold-water supply fails, and vice versa. Should the thermostatic liquid-filled motor itself fail, a "Fail-Safe" provision automatically closes hot and cold water poppets.

Mixing accuracy holds water delivery temperature to ±2 deg. under any of these conditions: A 75% drop in inlet pressure, 45-deg. fluctuation in hot-water supply temperature, or 85% restriction of discharge flow.

Since outlet and inlets of mixer can be rotated through a complete circle in 90-deg. steps, it can be installed in any position to eliminate cumbersome, costly piping arrangements.

For Your Specific Need...

The ENTOLETER® IMPACT MILL

...is available for

- centrifugal mixing
  or
- particle size reduction
  or
- infestation control

with

- constant speed drive
  or
- variable speed drive

with material impact surfaces of

- steel
  or
- stainless steel
  or
- abrasion-proof ceramic material

in capacities from

- 2500 pounds per hour
  to
- 60 tons per hour

designed for

- floor mounting
  or
- suspension from above

The "ENTOLETER" IMPACT MILL is the most versatile equipment available to the Food Industry.

The trademark "ENTOLETER" is your guarantee of complete satisfaction

ENTOLETER DIVISION
SAFETY INDUSTRIES, INC.
Formerly The Safety Car Heating and Lighting Co., Inc.
P O Box 904 New Haven 4, Conn.

Equipment & Supplies

Compact unit is factory set to operate at temperatures between 65 and 115F., while an 85-160 F. range can be furnished. Maximum temperature settings can be lowered by a simple concealed adjustment, which can be locked to prevent tampering.—*Powers Regulator Co., 3434 Oakton St., Skokie, Ill.*

Circle 119D on Reader Service Card

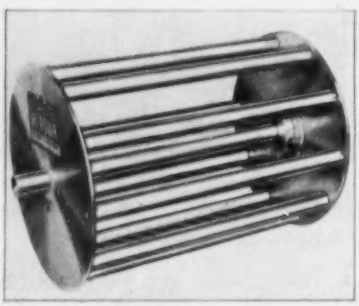
Flooring Material Resists Abrasion, Chemicals

Recommended for use directly over concrete, a new flooring material is said to be above five times as abrasion resistant as concrete, and four times stronger.

Known as Corocrete "A", it offers increased protection from attack by acids, alkalies, and solvents. Consisting of a thermosetting resin liquid, a hardening agent, and an aggregate-type filler, it is mixed at the job site for immediate application. Material handles like cement topping and is applied in thicknesses from ¼-in. minimum to ¾-in. maximum per layer.

It cures in a few hours to a dense, impermeable, and non-dusting surface—especially important when minimum plant downtime is a factor.—*The Ceilcote Co., 4883 Ridge Rd., Cleveland 9.*

Circle 120A on Reader Service Card



Product Quality Guarded By Dual-Purpose Magnet

Installed at the discharge of chutes, or in ducts, this magnetic cylindrical grate does double duty. It removes iron particles, also prevents clogging or bridging of material by its rotation.

Designated Rota-Grate, it consists of multiple stainless-steel, Alnico V tube magnets mounted horizontally between stainless end plates. Entire assembly rotates around a central shaft that extends beyond the plates to accommodate a drive pulley, thus

EXPERTS LIKE TO DO BUSINESS WITH EXPERTS

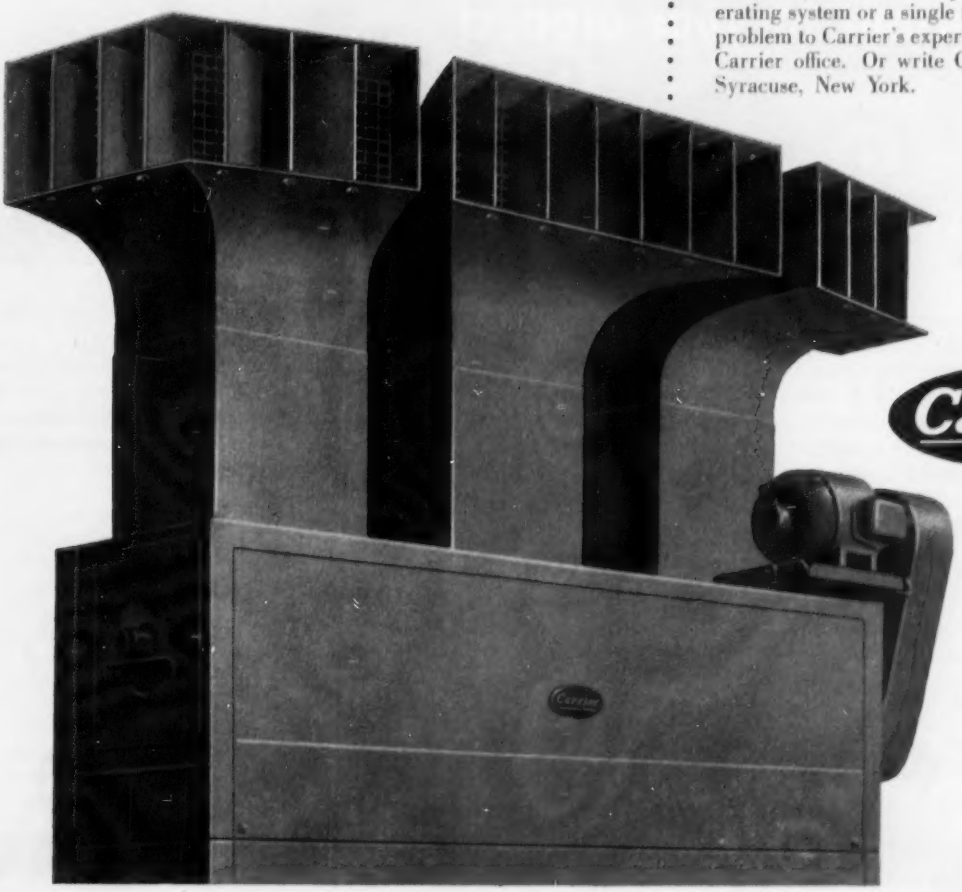
DUBUQUE CHOOSES CARRIER AMMONIA REFRIGERATION

Chilling, curing, aging, boning, packaging—Carrier Ammonia Refrigeration serves all departments of the Dubuque Packing Company plant in Dubuque, Iowa. And Carrier designed the equipment so that it could be added to the plant's existing refrigeration systems, thus holding down costs while increasing efficiency and capacity.

Carrier ammonia refrigerating equipment is on the job in food processing plants, large and small, all over the world—serving companies like Geo. A. Hormel, Austin, Minn.; Rath Packing Company, Waterloo, Ia.; Fox DeLuxe Foods, Watertown, S.D.; and Louis Burk, Inc., Philadelphia, Pa.

May we assist you?

Whether you need a complete ammonia refrigerating system or a single machine, bring your problem to Carrier's experts. Call your nearest Carrier office. Or write Carrier Corporation, Syracuse, New York.



ammonia refrigerating systems

Carrier

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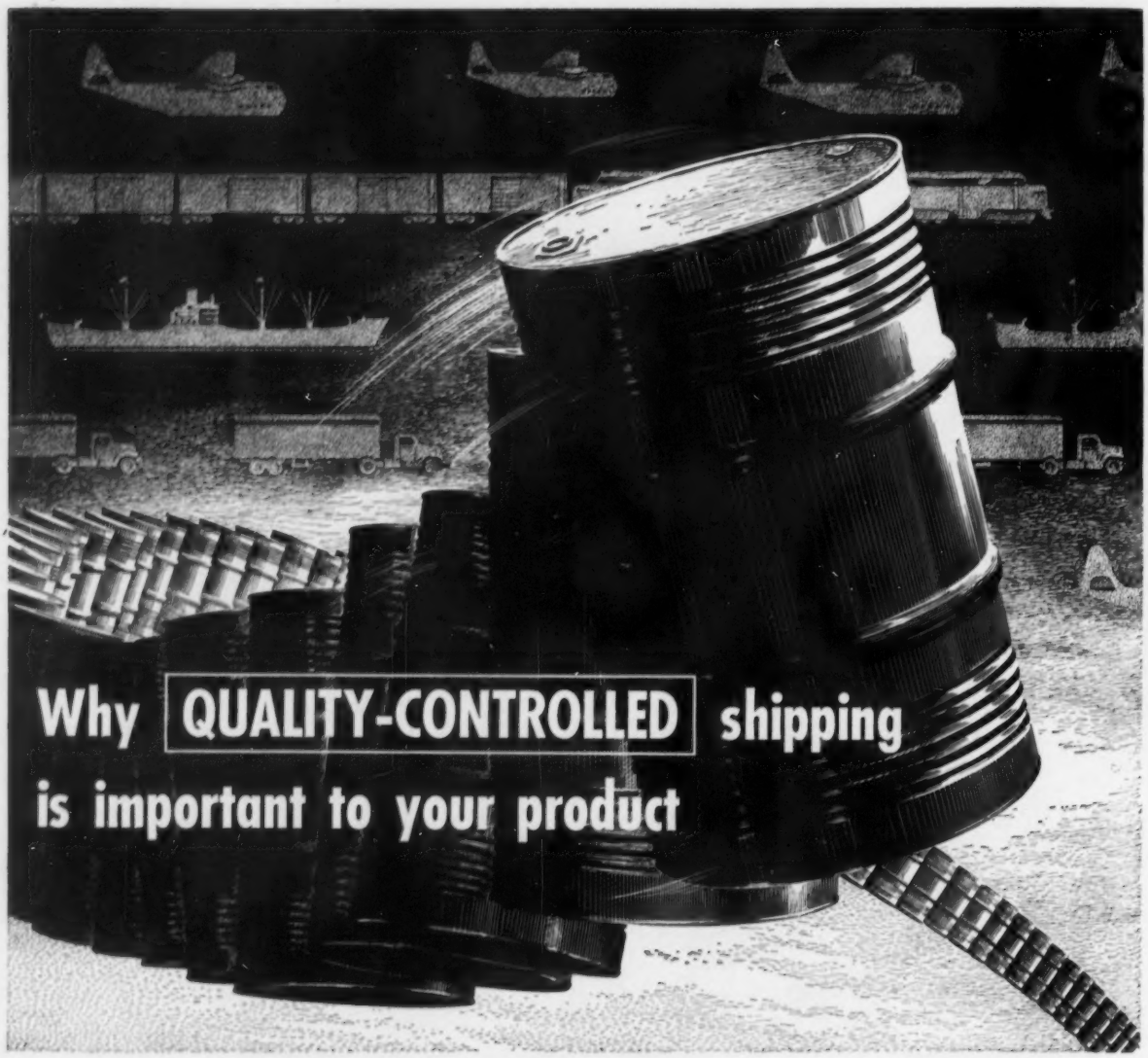


QUALITY control measures that end at your plant door aren't enough. Your product can become seriously contaminated if shipped in containers that aren't specially treated to maintain your product's purity.

Contaminated products are great "customer-losers." Yet, contamination-en-route can be avoided by shipping in USS Steel Drums. That's because every USS Steel Drum goes through several special steps to make all surfaces spotlessly clean and free of scale. Once inner and outer surfaces are prepared, they are thoroughly coated with a special phosphate solution that assures long-term freedom from rust. This combination of immaculate steel surfaces and special phosphate-coating protection means that your product will arrive at your customer's door as pure as the moment it left your plant --when you ship in USS Steel Drums.

Product-protecting USS Steel Drums are available in sizes from 2½ to 110 gallons, either plain or decorated. To meet special needs, we have a wide variety of custom fittings and openings.

UNITED STATES STEEL PRODUCTS
DIVISION

UNITED STATES STEEL CORPORATION
DEPT. 676, 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Los Angeles and Alameda, Calif. • Port Arthur, Texas
Chicago, Ill. • New Orleans, La. • Sharon, Pa. • Camden, N. J.

USS STEEL DRUMS

"It's Better to Ship in Steel"

USS

UNITED STATES STEEL

permitting installation in flange- or pillow-block-type bearings.

Gravity moves material through the network of tubes which, also in motion, comb the flow for efficient separation. A speed of 15-20 rpm. is recommended for best results under average conditions. Periodically, iron accumulations are quickly removed by wiping the tubes clean. No other maintenance is required.

Units are available in standard diameters of 12, 16, and 22 in. with 10, 15, and 20 tubes respectively. Widths, starting at 4, 8, and 12 in. respectively, continue through 4-in. increments to a maximum of 36 in. for all diameters.—*Eriez Mfg. Co., Erie 6, Pa.*

Circle 1208 on Reader Service Card

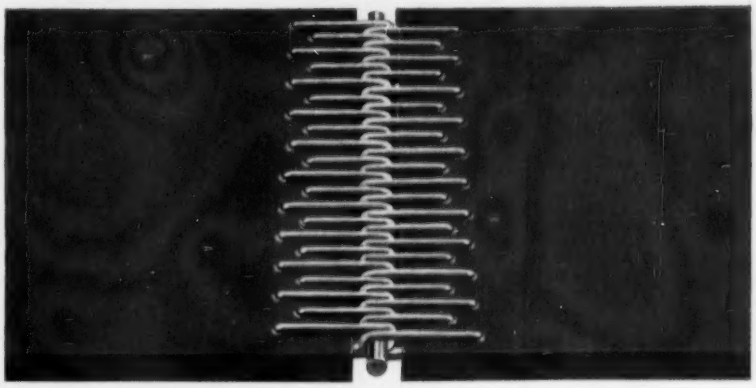
Eliminates Hand Cleaning Of Tank Interiors

Manual cleaning inside of a storage tank—a cumbersome and costly job—is no longer necessary with this new fan sprayer.

Designated Model 561, it consists of a horizontal pipe fitted with two rows of solid jet nozzles set close together and at increasing angles. A small hydraulic motor imparts an oscillating motion up to 110 deg., and entire unit is mounted on small rubber wheels. Combined forward and oscillating movements enable sprays to hit most surfaces directly, while the remainder are cleaned by flow-down of solution and rinse water.

In use, sprayer is fitted with an extension-pipe handle for portability. Under normal operating conditions and the recommended pressure of 60 psi., it cleans surfaces about 12 ft. away. Unusual size or shape of tank may call for increased pressure or moving the sprayer into several positions. Weighing less than 10 lbs., unit is made of brass and is furnished with

the fastest way to make ends meet



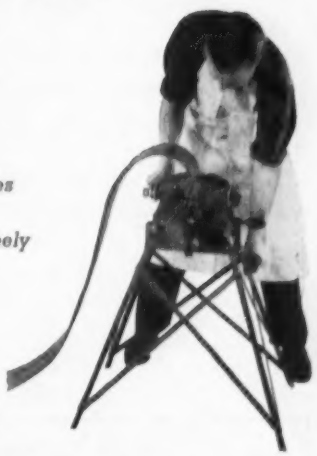
Clipper

HOOKS and LACERS

in materials handling, food harvesting and processing, power transmission, wherever flat ends must be joined.

Clipper belt lacing equipment for belts, aprons, tapes and ribbons!

- *produces secure, flexible joints in minutes*
- *does not injure belting*
- *gives smooth, flexible joint that rides freely over conveyor rollers*
- *is flexible both ways of the belt*



WRITE FOR FREE SAMPLE

Send a sample of your belting, apron or ribbon to Clipper with an outline of your problem. They'll determine the best method of fastening and then lace your sample FREE.

Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

988 Front Ave., N. W., Grand Rapids 2, Michigan

Don't take chances with food wrappers

play safe with NON-TOXIC Patapar®

When selecting a packaging material that is to come in direct contact with food, make sure it has no impurities that might be imparted to the food. Even a faint trace of toxicity in a wrapper can cause consumer dissatisfaction.

You can have utmost confidence in NON-TOXIC Patapar Vegetable Parchment. This wet-strength, grease-resisting paper is made from pure cellulose. It contains no resins or sizings. There is nothing to impart "off" flavor.

Patapar is the perfect wrapper for protecting butter, cheese, poultry, ham, sausage, bacon, margarine, shortening, ice cream and many other foods.

Patapar is furnished in sheets or rolls, plain or colorfully printed with non-toxic inks. If you would like samples for testing, write telling us your requirements.

Send for new booklet describing special types of Patapar for industrial and business uses.

Patapar®
Vegetable Parchment
HI-WET-STRENGTH · GREASE-RESISTING

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

Equipment Applications

terminal strainer plus a large strainer for the solution tank—*Oakite Products, Inc., 126 Rector St., New York City 6.*

Circle 123A on Reader Service Card

Self-Cleaning Air Filter Handles Difficult Jobs

If air cleaning in your heating, ventilating, or air-conditioning system is a problem, you'll be interested in a redesigned self-charging electrostatic unit.

Called Heavy-Duty Pliotron, it operates efficiently where dust concentration is unusually high, where large particles (chaff, straw, or insects) impinge on filter surfaces, and where effective single-pass filtration is essential. Units hold air-borne particles magnetically. They are simply cleaned by immersing in warm water, which dissipates the static charge to release adhering substances.

The 3-section cleaner consists of electrostatic plastic materials. A vinylidene chloride screen forms the intake side, while the outlet employs a plastic-bonded, glass-fiber mat. Sandwiched between these layers is shredded polyethylene film—*Goodyear Tire & Rubber Co., Industrial Products Div., Akron, Ohio.*

Circle 124A on Reader Service Card

Truck Battery Recharged By Plug-In Power Unit

Recharging the battery of this lift truck is just a matter of plugging its power unit into any 110/120v., 60-cycle outlet. Thus, battery can be given a power boost whenever truck is not in use—eliminating need for substitute batteries and special charging areas.

Unit (K-W) has a permanently

Red-hot recipe for tougher tank cars

Typical DURADOME—designed for formaldehyde service

WHEN heavy-gauge steel is formed and welded into a tank car tank . . . certain internal stresses develop which tend to weaken the metal. That is why ACF tanks are "popped into the oven" to relieve these stresses.

Each tank is scientifically heated under controlled conditions. This results in a tank of uniform strength which is ready to resist the forces of load and impact which occur during transportation.

When you're looking for the toughest tank cars ever built, look to Shippers'. We are the exclusive sales agent of ACF-DURADOME tank cars for industry. You'll find a nationwide network of Shippers' Car Line offices and repair shops ready to serve your transportation needs.

Whatever your tank car requirements may be, better talk to Shippers' . . . and get the benefits of *modern* tank car service!

SHIPPERS' CAR LINE

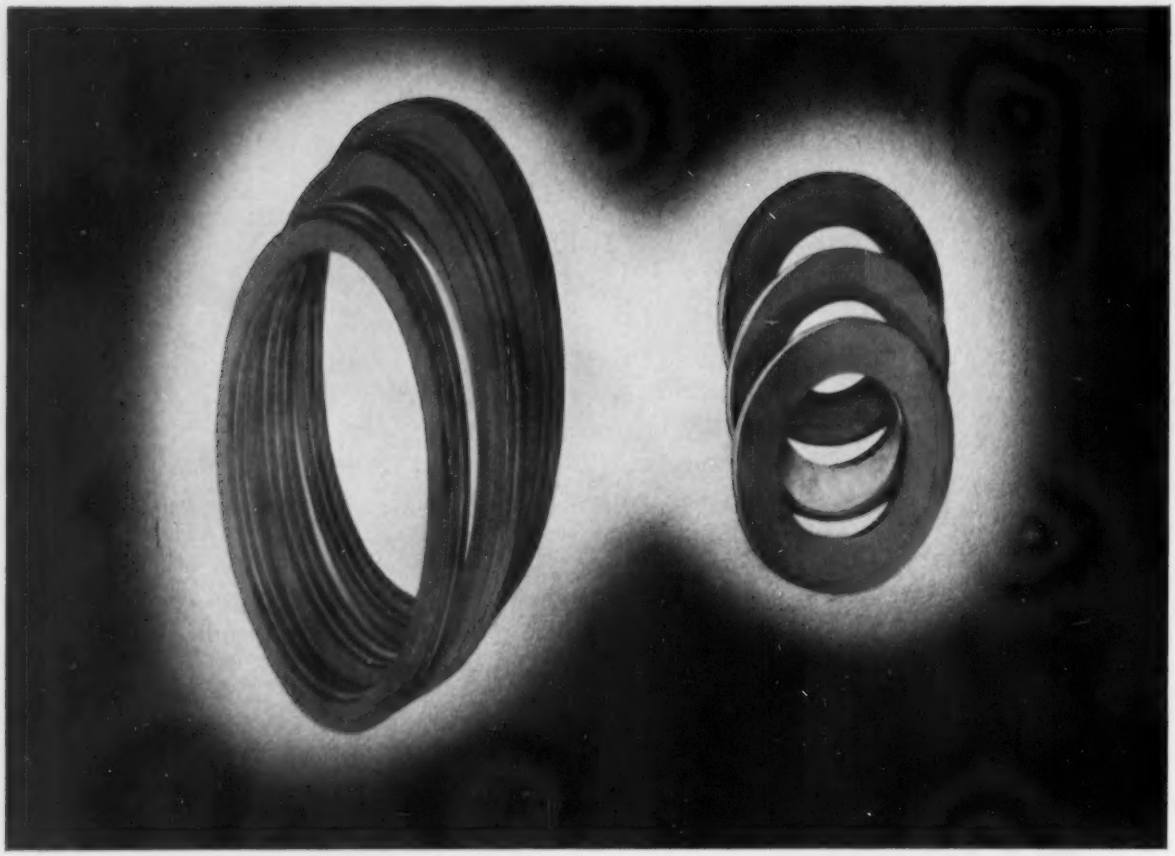
Division of ACF INDUSTRIES, Incorporated

30 Church Street, New York 7, N. Y.

CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO. • RED HOUSE, W. VA.

For more data, circle this page number on card at front →

Non-toxic Gaskets at non-toxic Prices...



U. S. low-cost Gaskets—lead- and zinc-free!

These gaskets are cured without commonly-used lead or zinc—and are therefore free of any toxic elements. Rubber is the only material that combines maximum flexibility and resiliency. And these gaskets, being all rubber, have a flexibility, resiliency *and durability* approached only in high-priced packings made of other materials.

These non-toxic, low-cost gaskets, cured specially for the food industry, are available at any of the 28 "U. S." District Sales Offices, or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, New York.

Mechanical Goods Division

United States Rubber

mounted charger that can be left "on" without damage to the battery. Routine charging can be done overnight without disconnecting battery from trucks since charger is permanently connected to the terminals.

Unit has no moving parts, fans, relays, or contacts. Action is automatic with charging rate controlled by condition of battery. Size and type supplied depend on make and model of truck.—*K-W Battery Co., 3608 W. Howard St., Skokie, Ill.*

Circle 124B on Reader Service Card

Processors Can Cut Costs By Making Own Foil Pans

Bakers, frozen-food processors, and confectioners may now cut packaging costs by producing these aluminum-foil pans (Patti-Pan) on their own lines at up to 5,000 per hr.

In addition to convenience, in-plant production offers saving of storage space and lower freight charges. Pans can be made with a new press for about the cost of base metal. Round, square, oblong, and other shaped dies are used to make pans of desired shape and depth, limited only by size of foil blank.

Three models of the press use dif-

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New design Refrigerant Condenser

...gives far more efficiency and better, trouble-free service

With this new, sectional design Niagara condenser you avoid the many troubles due to faulty condensing and get at all times the full capacity your refrigerating plant should afford.

You benefit from extra saving in upkeep labor and expense. The casing of this new condenser is made of sections each separately removable, giving you access to all parts for easy inspection to head off dirt and corrosion, to clean the coils easily from either side.

You benefit from greater efficiency in condensing. A simpler method of using evaporative cooling improves heat transfer. You benefit from Niagara features that remove super-heat before condensing and keep the system purged of oil. You save 95% of the cooling water cost.

You benefit from a low first cost, lower freight cost and less expense in erection.

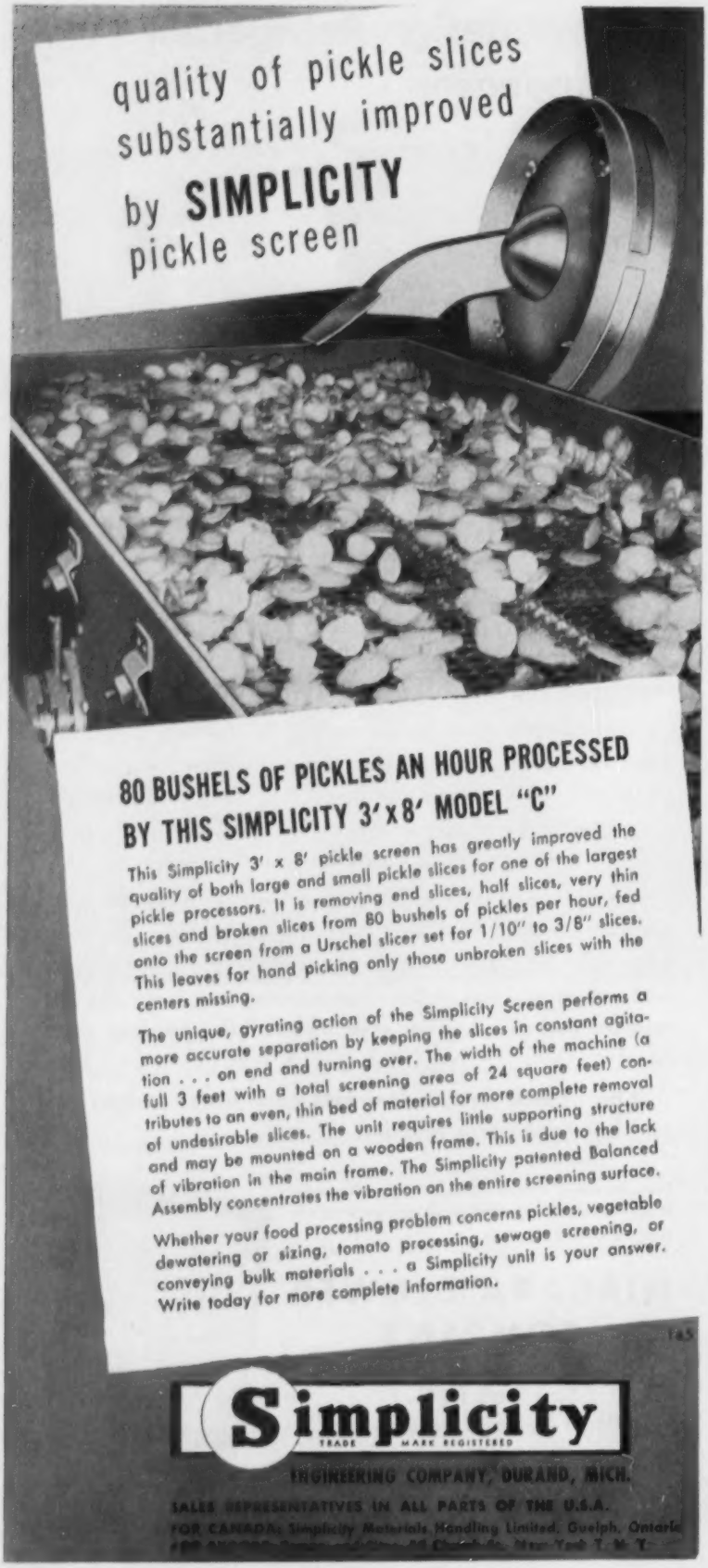
Capacity range is from 90 to 240 tons. Write for Niagara Bulletin 131. Find out how your plant can save expense this season.

NIAGARA BLOWER COMPANY

Dept. F.I., 405 Lexington Ave.
New York 17, N. Y.

District Engineers in Principal Cities.

NIAGARA — *Over 40 Years' Service in Industrial Air Engineering*



80 BUSHELS OF PICKLES AN HOUR PROCESSED BY THIS SIMPLICITY 3′ x 8′ MODEL "C"

This Simplicity 3′ x 8′ pickle screen has greatly improved the quality of both large and small pickle slices for one of the largest pickle processors. It is removing end slices, half slices, very thin slices and broken slices from 80 bushels of pickles per hour, fed onto the screen from a Urschel slicer set for 1/10" to 3/8" slices. This leaves for hand picking only those unbroken slices with the centers missing.

The unique, gyrating action of the Simplicity Screen performs a more accurate separation by keeping the slices in constant agitation . . . on end and turning over. The width of the machine (a full 3 feet with a total screening area of 24 square feet) contributes to an even, thin bed of material for more complete removal of undesirable slices. The unit requires little supporting structure and may be mounted on a wooden frame. This is due to the lack of vibration in the main frame. The Simplicity patented Balanced Assembly concentrates the vibration on the entire screening surface.

Whether your food processing problem concerns pickles, vegetable dewatering or sizing, tomato processing, sewage screening, or conveying bulk materials . . . a Simplicity unit is your answer. Write today for more complete information.

Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY, DURAND, MICH.
SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario

Equipment & Supplies

ferent width reels of foil up to 6 in., and one employs interchangeable dies. No special operator training is necessary, since press requires attention only when reels are loaded.— *Basca Mfg. Co., 2222 N. Olney St., Indianapolis.*

Circle 127A on Reader Service Card

New Ingredients

Line of Dry-Powder Bases For 'Convenience' Foods

Here are new dry mixes for processors interested in the fast-growing convenience-food market. Most of them require only addition of water to complete the product.

Called Blend & Serve, items are available for preparing gravies, sauces, salad dressings with or without vinegar, soups both clear and heavy bodied, beverage powders with or without sugar or with Sucaryl, milk shakes, and seasoning salts.

Ready-to-use bases may be packaged directly. Or basic seasonings may be furnished for final mixing with dry carrier.—*Dodge & Olcott, Inc., 180 Varick St., New York City 14.*

Circle 128A on Reader Service Card

Icing Conditioners Offer Versatile Stabilization

Individual stabilizer requirements of various icings may be met by three new powdered conditioners.

They provide resistance to cracking, melting, and sticking with wrapped or unwrapped items. Stabilizers mix easily with other icing ingredients and save storage space since they are concentrated.—*Mallet & Co., 601 E. General Robinson St., Pittsburgh, 12.*

Circle 128B on Reader Service Card

Orange Beverage Base Imparts Juice Effect

Now available in more concentrated form is a new orange beverage base that imparts the necessary cloud to finished carbonated or still drinks, plus a desirable juice effect.

One ounce of the clear product (Redi-Mul Orange) flavors 6 gal. of syrup or 36 gal. of beverage. Compounded to prevent ringing in the bottle, its use eliminates need for homogenizing, while high concentra-

Many extra advantages at no extra cost with this low-pressure pipe covering

Insulating efficiency of ½" thick Armaglas* Low-Pressure Covering is equal to or better than ¾" or 1" thickness of ordinary materials. Lightweight, thin wall design speeds handling and saves space in crowded quarters. Tough glass fiber composition eliminates cracking and crumbling during application. High shrinkage resistance keeps joints tight and neat looking. White vapor barrier jacket needs no further finishing on cold water, hot water, or low-pressure steam lines. Made in molded half sections for pipe and tubing to 12".

Armaglas is one of the quality products in the complete line of Armstrong Industrial Insulations. Armstrong also offers you a complete contracting service, geared to install these products economically and efficiently.

For complete information on Armaglas, send for free booklet. Booklets on other Armstrong Insulations also supplied on request. Check the ones you want on the coupon below.

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☐ Armstrong Insulcolor®, Weatherproof Coating in Eight Colors

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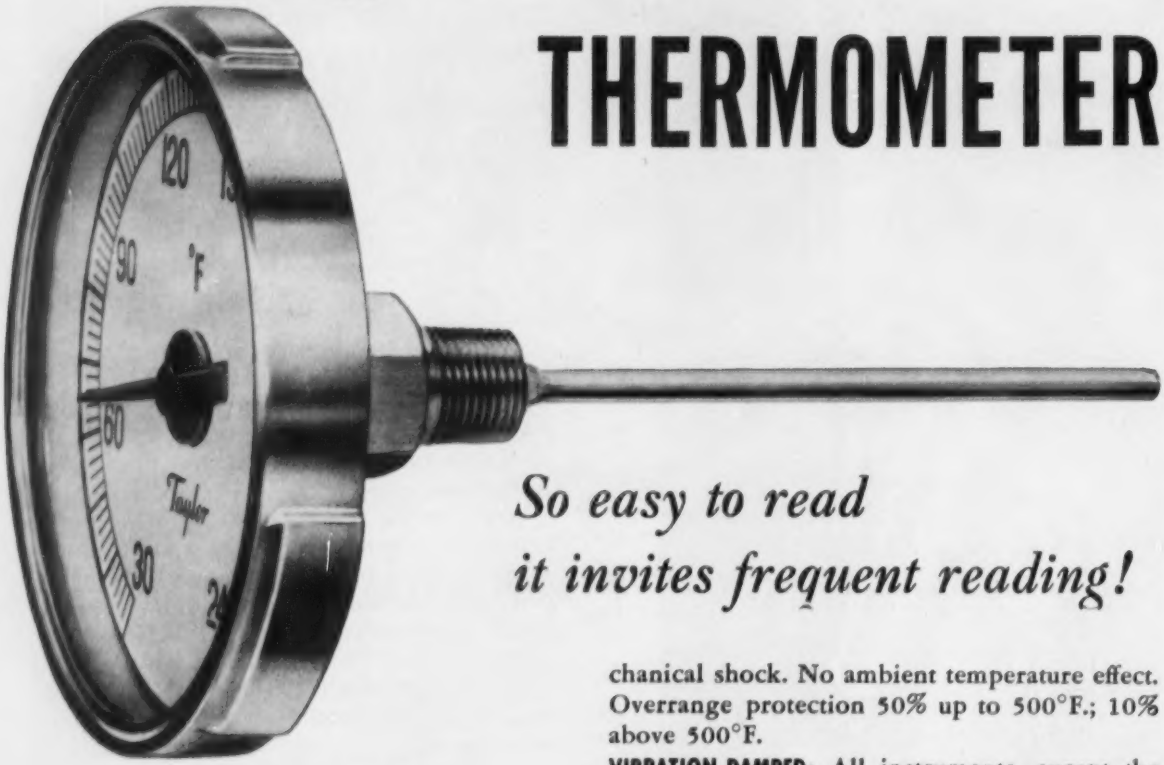
Traditional Taylor accuracy in a low cost instrument

THE NEW BI-THERM* 5" DIAL THERMOMETER



So easy to read
it invites frequent reading!

A SIMPLE, dependable and economical thermometer with many applications throughout the canning industry, such as Sterilizers, Hot Water Storage Tanks, Open Tanks, Blanchers, Open Cookers, Exhausters. Wide variety of ranges from minus 40° to +750°F. Also available with three inch dial; stem lengths of 4, 6, 9, and 12 inches; separable wells of brass, steel, type 304 stainless steel or monel.

EASY TO READ: The large dials are highly readable because of black figures and graduations on an aluminum background.

RUGGED: All exposed metal parts are of arc welded, corrosion-resistant stainless steel. All instruments are waterproof. All mechanical connections are welded for greater reliability.

ACCURATE: These instruments are accurate within ±1% of range, over the entire range. Simple zero-setting features correct minor errors in readings which might result from severe mechanical shock. No ambient temperature effect. Overrange protection 50% up to 500°F.; 10% above 500°F.

VIBRATION DAMPED: All instruments, except the 200° to 750°F. range, are silicone damped against vibrations. Result is increased speed of response, minimum pointer vibration, and elimination of pointer chatter when the thermometer is handled.

ECONOMICAL: Costs only **$16** to **$26,** depending on dial size and length of stem. Ask your Taylor Field Engineer, or write for **Bulletin 98267.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Trade Mark

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

New Chemicals

tion saves shipping charges and storage space.—*Dominion Products, Inc., 10-40 44th Dr., Long Island City, N. Y.*

Circle 128C on Reader Service Card

Water-Soluble Turmeric Is Highly Concentrated

Greater color value and increased water solubility are advantages cited for a highly concentrated oleoresin turmeric.

Known as No. 800, it is recommended as a seasoning and as a yellow vegetable food color. Material is presolubilized and color stabilized.—*Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York City 13.*

Circle 131A on Reader Service Card

New Chemicals

Bacteria Count Cut By Sanitizing Wax

To increase food-plant sanitation, this non-slip wax incorporates a new germ-controlling factor that inhibits the growth of bacteria.

Protection starts as soon as product (Demon) is applied and lasts the life of the wax. Latter can be safely used on all types of flooring materials, and imparts no objectionable odor. Occasional damp mopping rejuvenates its inhibiting power and restores high gloss.—*The Penetone Co., Tenafly, N. J.*

Circle 131B on Reader Service Card

New Pipe-Joint Compound Seals Corrosive Liquids

Employing a Teflon base, this chemically inert pipe-joint compound is designed to seal almost any highly corrosive liquid in service up to 212F.

Known as Chemlon, it also offers a low coefficient of friction which reduces wrench torque. This permits drawing connections up to greater tightness without undue strain.

Non-adhesive quality of Teflon and non-hardening characteristics of the compound allow quick disassembly of connections, even after years of severe service. Particularly adaptable for use on aluminum, stainless, Monel, or plastic pipe, material is available in 2 oz. screw-type jars.—*Crane Packing Co., 6400 Oakton St., Morton Grove, Ill.*

Circle 131C on Reader Service Card

Gentle Drying
Retains Flavor
Nerco-Niro®
Spray Dryers . . . . . .
Dry foods the efficient, modern way—and, retain the natural flavor. Gentle drying is the answer. Nerco-Niro dryers won't harm heat-sensitive foods, even when using high inlet-air temperatures. In addition, the food product is gently handled—no harsh scrubbers or sweepers in these units.
Maximum solids recovery, closely controlled particle size, free-flowing product and easy cleaning are all important reasons why Nerco-Niro Spray Dryers are so widely used in the food industry.
Write for Bulletins No. 230 and 226.
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1637 N. Illinois St., Indianapolis 2, Ind.
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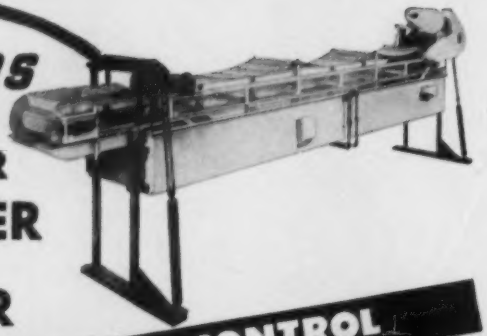
the Robins even-flo HOT WATER BLANCHER and COOKER



MORE POSITIVE CONTROL
CONTINUOUS OPERATION
HIGHEST DEGREE OF UNIFORMITY

for Blanching Greens

for Cooking Shrimp

for Other Processes where controlled time and temperature immersion in hot water are required

Designed for continuous hot water blanching of greens (a field in which it has won enthusiastic acceptance), the Robins Even-Flo Blancher can be a part of any production line which involves moving a product through hot water.

Stock is carried through hot water in an endless series of "covered baskets" formed by upright separators on a wire mesh belt. Pile-ups and bruising of stock are eliminated. Every piece of stock is thoroughly immersed. Time cycle and temperature controls assure continuous operation and uniformity of processed product.

Height of feed and discharge are adjustable. Tank lowers (hydraulically) for easy cleaning. All parts are easily accessible—completely sanitary.

Here is a Robins-designed processing machine you'll want to investigate. Get in touch with the Robins sales engineer in your locality or write or wire direct for complete information.

A.K.Robins AND COMPANY, INC.

Manufacturers of Food Processing Machinery Since 1855

713-729 East Lombard Street • Baltimore 2, Md.

Robins experience is available to food processors in advising on processes; recommendation of "standard" equipment; designing, building and installing special equipment; line or complete plant layout. In food processing plants all over the country—wherever you look—you'll see ROBINS.

Briefs . . .

Telescoping Wheel Bridge—for use between power and gravity conveyors, or between two power conveyors—permits 6 in. of belt-pulley takeup without removing gravity conveyor. Units are available in 12, 18, and 24-in. widths. —*Rapid-Standard Co., 342 Rapistan Bldg., Grand Rapids 2, Mich.* (132A)

New Air-Atomizing Burner offers highly efficient combustion of No. 6 oil. Complete package unit, wired and ready for service, is rated at 90 gph.—*Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12.* (132B)

Laboratory Dissolver, for use with 2-gal. container, permits continuously variable impeller speeds of 1,600-6,150 rpm. Unit is about 21 in. high, 10 in. wide, and 29 in. long, weighs 122 lb. with 1-hp. open-type motor. —*Morehouse-Cowles, Inc., 1150 San Fernando Rd., Los Angeles.* (132C)

Vibration Detector shuts down rotating equipment before costly damage occurs. Applications include fans, blowers, and air compressors.—*The Beta Corp., Forest Ave. at Ridge Rd., Richmond 26, Va.* (132D)

Moisture Analyzer has electronic indicator that shows end point of titration with Karl Fischer reagent. Determinations take 5-15 min.—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.* (132E)

Centrifugal Dust Collector uses special arrangement of cyclone tubes to boost gas-handling capacity for a given pressure drop. Shell and hopper are of 7-gage bolted-steel construction with cast-iron inlet tubes and vanes.—*Research-Cottrell, Inc., Bound Brook, N. J.* (132F)

Waterless Hand Cleaner removes soil and grease without abrading or defatting the skin.—*West Disinfecting Co., 42-16 West St., Long Island City, N. Y.* (132G)

Vinyl Electrical Tape, offered in 8- and 10-mil thicknesses, tests to 10,000 dielectric volts, resists water, acids, alkalis, and corrosion.—*Quaker Rubber Div., H. K. Porter Co., Tacony & Comly Sts., Philadelphia 24.* (132H)

New Fork Trucks have reduced battery-compartment height for operation where low headroom is a problem. Although operator sits 18 in. lower, there is no loss of visibility or truck efficiency.—*Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3.* (132I)

"Another product safely shipped in Inland 'protection-ered' containers"*

FILLING A SWEET ORDER

In protecting the flavor and purity of jellies, fillings and toppings in transit, Inland "protection-eered" containers really deliver the good(ie)s! Take the case of H. A. Johnson Co. and its Murray Co. Division, 80 years producers of quality food products for the bakery, confectionery, and ice cream trades. They produce not only jams and jellies, but just about every kind of sweet-toothsome filling to add an extra touch to sweet romance. After preparing their products with painstaking care, it's only natural that Johnson ships them in Inland special-lined pails. This way, there can be no doubt that the products will arrive at their destinations every bit as pure and flavorful as the moment they left the plant.

Inland can design a lining to handle any kind of food product sold. In literally hundreds of cases, Inland lined containers have provided the answer to shipping problems while reducing handling costs. The Inland Steel Container representative will be happy to help solve *your* container problems. Write Bob Boecher, Dept. 318B.

**the right container, with the right lining for your product*

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company, 6532 South Menard Avenue, Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

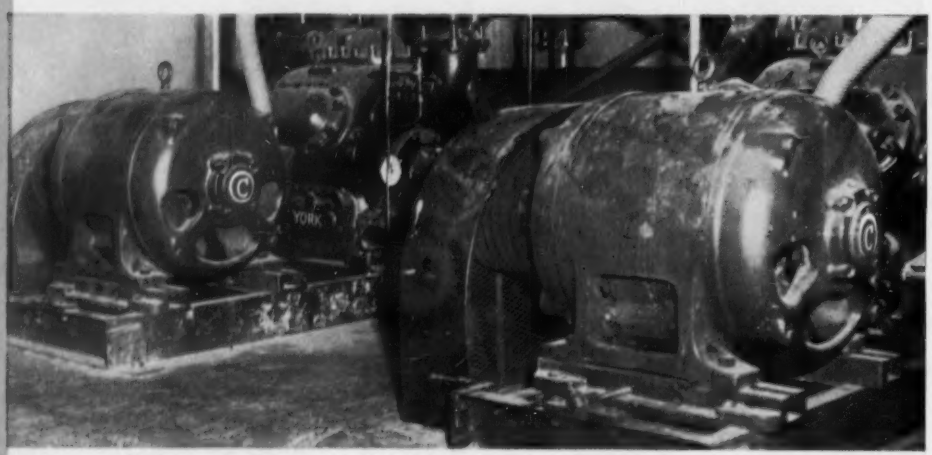
For more data, circle this page number on card at front →

Special low-current starting costs less WHEN YOU SPECIFY

Century PART WINDING START MOTORS

Here's the easy and inexpensive answer to having big motors that will start easily when starting current is limited. Part winding starting is available on all popular size Century motors up to 400 H.P., polyphase, in drip proof, totally enclosed and explosion proof frames, horizontal or vertical mounting.

For fast service from stock, call your nearby Century Distributor or Century District Sales Office.



Two 50 H.P. Century Part Winding Start motors power these unloading type air conditioning compressors. When starting, just half of the winding is energzied, drawing less than two-thirds of normal starting current. In a few seconds, the full winding is connected and the motor delivers full torque at full current.

Get your free copy of our bulletin: "Where Low Starting Current is Required." Mail this coupon today . . .

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Performance Rated © MOTORS
1/20 to 400 H.P.

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Equipment Applications

Sanitary Magnetic Trap Guards Candy Quality

A permanent magnetic trap, installed in a pipe line handling liquid caramel, solved the problem of detecting and removing ferrous particles at Curtiss Candy Co., Chicago.

Situated on the suction side of a pump, unit (Ferrotrap, Model B, Eriez Mfg. Co., Erie 6, Pa.) removes 10-12 oz. of small pieces of iron or iron fines per week. These might otherwise damage the pump and impair product purity.

Trap is quickly installed and functions equally well in any position. Entire assembly is designed as a one-piece unit to facilitate quick removal for cleaning. No tools are required and there are no small parts to lose.

Circle 135A on Reader Service Card

Baker's Handling Cost Cut By Gasoline Fork Lifts

Use of gasoline-powered fork-lift trucks has cut materials handling costs substantially for Marckx Bakery, Gresham, Ore.

This equipment (Towmotor Corp., 1226 E. 152nd St., Cleveland) has stepped up conveying operations in every department—receiving, processing, storage, and shipping. It now enables mass handling of bakery raws through palletization, and bulk handling of flour in 1½-ton aluminum bins.

Circle 135B on Reader Service Card

Thin-Film Unit Evaporates Sensitive Gelatin Solution

Specifications for a new evaporator to be used at the Kearny, N. J. plant of Swift & Co. in the manufacture of

Push Button Quality Control

20,000 Batches a Year!

For closer, automatic control over cake and pastry sweeteners, Fischer Baking Co. switched their Asbury Park plant to liquid sugar . . . with accurate measurement provided by this Neptune Auto-Stop meter. Every 15 minutes the baker pushes buttons to set the pounds required, and opens the valve. The meter follows through . . . shuts off automatically at the right pound. Big savings are reported in time and labor. No more carting, piling, scaling, and dumping of granulated sugar. It's neater, too, because the sugar stays *inside* pipes and tanks all the way.

Trouble-free operation 20,000 times a year at Fischer's plant is only one of *many* cases where Neptune meters have proved dependability and sustained accuracy in food plants.

Free Metering Data Helpful booklet covers 150 industrial liquids, including water, syrup, liquid sugar, cocoa butter, cocoanut oil, chocolate, flavors, coffee, wine, alcohol, etc. Meters range from simple totalizers to Auto-Stops with electrical switch adaptations for controlling pumps, agitators, valves, etc. All have totalizing counters for accurate cost and inventory control.
Ask for Bulletin 566-VF.

NEPTUNE METER COMPANY
19 West 50th Street, New York 20, N. Y.

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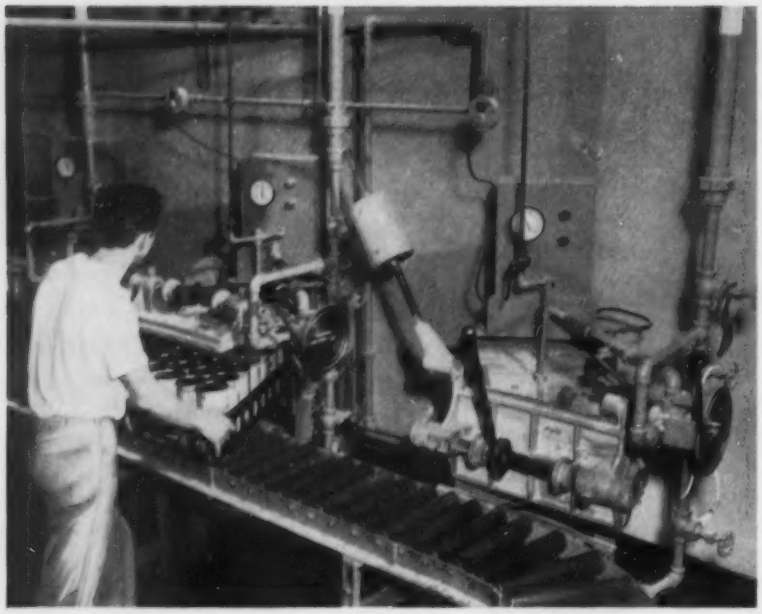
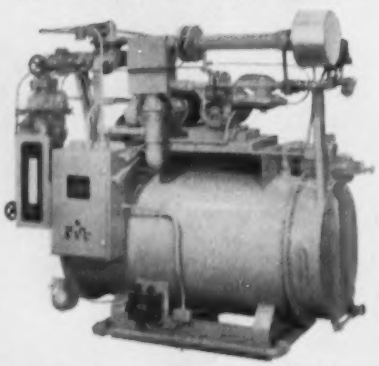


Dry Milk Processor Protects Nutritive Value of Product with Gas Atmospheres System

Maple Island, Inc. protects the nutritive value and taste of their dry milk products for long periods of time through the ingenious system of eliminating oxygen from the product from the moment of its manufacture until the moment of use.

The heart of this operation is an inert gas system that guards against oxygen during the packaging process. To bring their gas cost to an absolute minimum, Maple Island, after a thorough study, selected a 500 cfh Gas Atmospheres Inert Generator with dryers and trace oxygen removal units. The entire system gives them a very dry, high purity gas, and according to Maple Island officials—it has required a minimum of maintenance over a four year period — and had actually paid for itself before it had been in operation a single year. Even though Maple Island has expanded their operations substantially, the original Gas Atmospheres unit gives them the flexibility they require. By running it during the off periods and compressing and storing the excess in tanks for use the next production day, they have not found it necessary to add further equipment.



Gas Atmospheres' XH50—500CFH Inert Atmosphere Generator of the type used by Maple Island to manufacture high purity gas composed of 88% nitrogen and 12% CO_2 completely void of oxygen. It is fully automatic in operation.

9904

gas Atmospheres, inc
equipment for producing industrial gases
20011 WEST LAKE ROAD CLEVELAND 16, OHIO

gelatin included protecting the product from excessive temperatures and metallic contamination.

These conditions were met by a thin-film unit (Turba-Film, Rodney Hunt Machine Co., Orange, Mass.) constructed of Inconel. Consisting of two vertical cylindrical sections with a central rotor, it operates on the agitated falling-film principle. In-process time is very short as feed, entering atop the first section, is whirled by rotor blades against heated walls, then discharges below.

Circle 135C on Reader Service Card

Novel Wall Construction Ups Plant's Flexibility

A unique aluminum and cellular glass "sandwich wall", only 3½ in. thick, is being used on Duquesne Brewing Company's new bottling plant in Pittsburgh.

Thin wall is of two sheets of ribbed aluminum siding with 1½-in.-thick insulation core (Foamglas, Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22).

A prime advantage of this construction, other than cost and time savings, is extreme flexibility which provides for future expansion. In that event, the outer wall next to a vacant area can be pulled down, new structural work erected, and the dismantled wall used to fill in the side of the extended building. In addition, part of the wall can be dismantled to allow passage of large equipment, then rebuilt.

Circle 136A on Reader Service Card

Starch Quality Improved By Efficient Separators

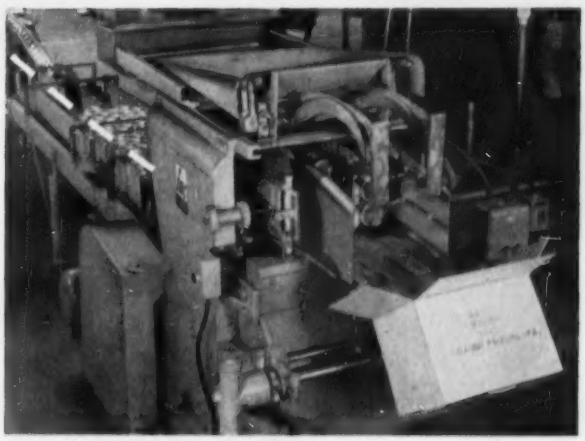
High-purity starch is being produced at National Starch Products' Corn Refinery at Indianapolis by a new method of separation that substantially reduces residual protein.

Gluten (protein) is removed from the starch by separators (Dorr-Clone, Dorr-Oliver, Inc., 100 Barry Pl., Stamford, Conn.) operating in a cyclonic process. Starch and gluten are forced through tapered tubes under pressure. A vortex formed in the center of each tube eliminates turbulence to permit clean separation of the two materials.

Entire system is totally enclosed and all metal parts including pumps and piping are of stainless steel for sanitation. Furthermore, the operation is fully instrumented for close control.

Circle 136B on Reader Service Card

FROM HARVESTING TO CASING



FMC "Stalk to Storage" Corn Equipment Produces a Higher Yield—Delivers a Quality Pack

FMC has virtually grown up with – and in – the corn canning industry, helping it grow through continuous contributions of research and modern equipment development. Many of the industry's achievements – its supremely high standard of quality, its ability to produce in enormous volume – are the direct results of this long and fruitful partnership. Today you'll find FMC *specialized* "Stalk to Storage" corn equipment in every corn canning plant in the country, many of which are completely FMC equipped. And every year you'll find new and improved equipment that has been carefully designed to do specific jobs better, faster, for greater profit for you. Some of this equipment is shown or briefly described here. Your line should also include FMC Fillers, Sterilizers, Labelers and other Can Handling Equipment.

Above: **The FMC SWEET CORN HARVESTER** *gets all the corn in the field, produces corn for canners, freezers, even for the cob-corn market! It replaces a hand-picking crew of 10 and at greater yield.*

Below: **FMC's NON-SHOCK CASER** *automatically cases cans fast (up to 1,200 cases per hr.)—limited only by the speed of the operator It's gentle to cans, labels and products, cuts costs.*

OTHER FMC CORN HANDLING EQUIPMENT

- **FMC PEERLESS CORN WASHER** tumbles, scrubs and rubs ears together under high pressure water sprays. Removes all loose husks, silk and dirt.
- **FMC DOUBLE HUSKER** cleanly trims butts and strips husks at 2½ tons of corn an hour. Unequalled for efficiency!
- **FMC EAR CORN SILK BRUSHER,** with its brushes spinning at high speed, washes and scrubs every row of kernels of every ear, removing all silk. The larger handles output of 20 FMC Huskers; the smaller, that of 8 Huskers.
- **FMC UNIVERSAL ROTARY CORN CUTTER** – a key machine in any corn line for maximum recovery of kernels from the cob, for cream style or whole grain packs. Up to 120 ears per minute depending on operator's skill.
- **FMC SANITARY BLENDING MIXER** meets the most rigid sanitary specifications for mixing and heating cream style corn. All contact parts are of durable, easy to clean stainless. 3 sizes.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

B.F.Goodrich

Photo courtesy of The Frito Company of Cleveland, Barberton, Ohio

Easy-to-clean Koroseal belt stands grease, salt—never gets rancid

IN this plant, the combination of salt and cooking oil on the hot chips used to mean short conveyor belt life. The cotton belt they were using was hard to clean, had to be boiled in caustic soda every week. What's more, it stretched, had to be refastened all too often.

Then the Koroseal belt in the picture was tried, and it solved all these problems at once. Because it's made of Koroseal flexible material, this B. F. Goodrich belt stands cooking oils, abrasive salt, animal fats, most acids as well as hard use, and just about everything else that ruins most materials.

Food particles can't grind into Koroseal's smooth, polished surface. That's why it is so easy to clean. A damp squeegee cleans the belt in the picture each time it passes by. Other users say that just a quick wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever.

Since Koroseal is completely waterproof, the belt never gets damp or soggy, and so can be used right after washing. Koroseal resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid.

Get in touch with a B. F. Goodrich distributor and let him tell you more about the line of belts developed by B. F. Goodrich for the food industry. *B. F. Goodrich Industrial Products Co., Dept. M-680, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich

INDUSTRIAL PRODUCTS

IFT Men Meet

—Continued from page 55

C. N. Frey, F. L. Gunderson, D. B. Hand, L. F. Hayhurst, H. K. Murer, and F. N. Peters, Dr. Oser acted as moderator. Gist of the session follows:

IFT's committee on food chemicals is set up not to support legislation, but to study the effect legislation has on the food industry.

Sooner or later, food technologists will be called upon to select food additives. They will have to determine if these chemicals are acceptable preservatives, antioxidants, and releasing agents. Or if they can function safely in packaging materials as insect repellants or antimycotic agents.

Specifically, technologists will have to be experts on the safety and hazards of such additives.

The liaison committee, it was declared, should not favor or condemn a particular bill on food additives. Its task is to tell IFT members of various bills before congress, and point out what these bill mean to the food industry.

Here are general agreements on food additives, arrived at by chemical manufacturers, food processors, government agencies, and academic groups:

1. Every new food additive must be tested by the manufacturer before being publicly used.

2. Manufacturer's test data and other relevant information must be submitted to FDA before additive is used.

3. Petitioner must bear full responsibilty for his legal compliance, but no man should be his own referee as to adequacy of safety and testing procedures.

4. Safety should be decided by modern concepts of toxicology—not by rule-of-thumb basis. And it should depend upon a realistic appraisal of factors that actually apply in use.

5. FDA should prevent advance sale of additives that have not been adequately tested, or which have been shown to be unsafe.

Here, a point of difference was brought up between industry and FDA: The manufacturer asks for an impartial court, whereas FDA seeks power to review its own decisions.

The Priest-O'Hara bills would require adequate pre-testing of every new additive used in food by the user to prove its safety. And they would vest in FDA considerable new regulatory power.

Only important difference between these bills and the law advocated by FDA is the forum to which the manufacturer may appeal after FDA has ruled against him.

Finally, FDA is firm in its view that legislation requiring pre-testing of food additives is vitally necessary for protection of public health. But FDA men, say they prefer no legislation rather than a bill that would embody the controversial declaratory judgment procedure.

End (Resume reading on page 56)

Flavor Evaluation

—Continued from page 48

And it is these people who are making the most serious mistakes in flavor testing.

The fact that we are dealing with human responses does not free us from the restrictions of a scientific experiment. On the contrary, it makes it absolutely essential that such basic controls be universally applied. And if the engineer or chemist is to administer the program he must be trained in experimental psychology so that he will be able to do this. Until this is done there can be no real progress.

Several specific actions can serve as catalytic agents for such progress.

- **First,** and possibly most important, would be the inclusion of adequate courses in experimental psychology in any curriculum designed to train food technologists.
- **Second,** encouragement and support should be given by colleges, professional societies, research foundations, and industry to basic studies of psychometric methods applicable to flavor control and research. And emphasis should also be placed on the urgency of publishing all valuable research work.
- **Third,** some professional society—probably the Institute of Food Technologists—should set the machinery in operation for establishment and sanctioning of standardized testing methods and terminology.

The progress that can be made through these suggestions will necessarily be slow in realization.

More immediate progress will come if today's flavor evaluators—chemist, engineer, or psychologist—will recognize the psychological foundation of their work and insist that the scientific method be basic in all testing.

In this way, flavor evaluation may begin to approach maturity.

Readers: What are your thoughts on Mr. Mitchell's pointed judgments of flavor evaluation? Do you say "Yea"? or "Nay"? FE's pages stand open, forum fashion, to pros and cons on this salient question. Just address Editor, Food Engineering, 330 W. 42nd St., New York City 36.

End (Resume reading on page 49)

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FOOD PROCESSORS — Now permissible to use time and money saving silicone defoamers: Antifoam AF Emulsion at concentrations up to 34 ppm; Antifoam A at concentrations up to 10 ppm.

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COMPANY _____

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Pump standardization

1 YOUR CHOICE OF MATERIALS OF CONSTRUCTION

All iron

All bronze

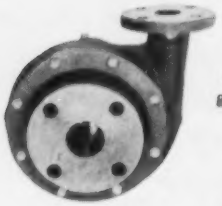
All Worthite

Iron with bronze impeller and trim

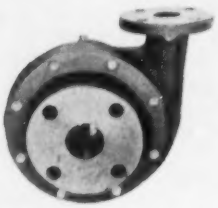
Steel with iron impeller and trim

Steel with bronze impeller and trim

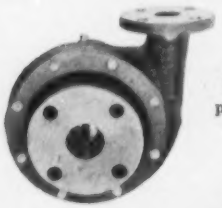
2 YOUR CHOICE OF LIQUID ENDS



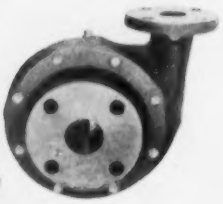
With closed impellers for general service



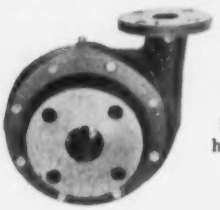
With open impellers for general and abrasive services



With closed impellers for process service



With open impellers for corrosive services



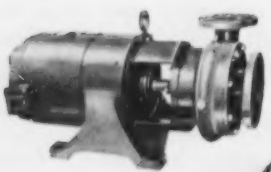
With closed impellers for hotwell service

3 YOUR CHOICE OF SHAFT SEALING METHODS

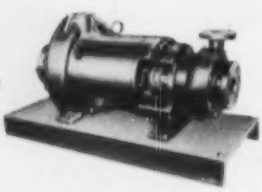
Stuffing box

Mechanical seal

4 YOUR CHOICE OF DRIVES

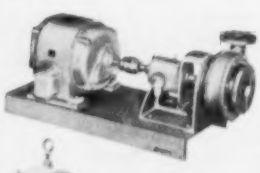


Monobloc Motor



Monobloc Turbine

CLOSE-COUPLED



Direct Motor Drive

Direct Turbine Drive

Belt Drive

FRAME-MOUNTED

Choose from 70,480 combinations. Worthington's SESC – Standard End Suction Centrifugal – line allows you to "custom-build" your pump from stock parts. In each of the 120 sizes, you have a choice of materials of construction, types of liquid ends, shaft sealing methods, and drives. Because the SESC line is built from standard, stocked parts, you get prompt delivery at competitive prices.

slashes inventory, reduces downtime, cuts maintenance

...yet gives you 70,480 combinations to choose from

STANDARDIZE AND SAVE! NOT SOMETIME IN THE FUTURE, BUT NOW!

With Worthington's SESC–Standard End Suction Centrifugal–line, you can cut your warehousing and inventory costs as much as 50%, greatly simplify pump maintenance, and reduce downtime.

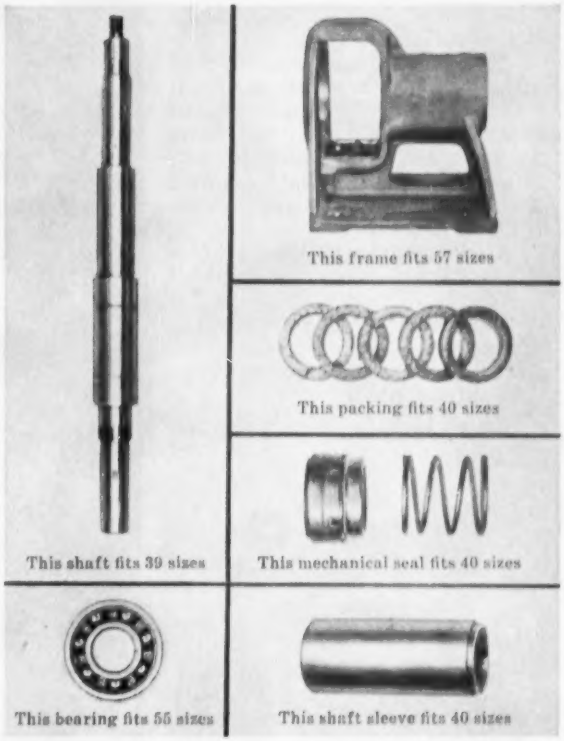
You get these benefits *without* sacrificing flexibility. In fact, the SESC line gives you an even broader selection. Because *parts* have been standardized and not *pumps* you can literally "custom-build" your pump to get exactly the right features for your particular application.

The complete Worthington SESC pump line consists of six separate types, all suitable for either motor, turbine, or belt drive. Ratings range up to 2700 GPM and 230 ft. head. Pumps and spare parts are available from field stock in all strategic areas as well as from the factory.

If you'd like to know more about the SESC line, write to Section PC61, Worthington Corporation, Harrison, N.J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont.

PC-6.1

WORTHINGTON


This shaft fits 39 sizes
This frame fits 57 sizes
This packing fits 40 sizes
This mechanical seal fits 40 sizes
This bearing fits 55 sizes
This shaft sleeve fits 40 sizes

Slashes parts inventory. You can cut inventory costs as much as 50% by standardizing on the SESC–Standard End Suction Centrifugal–line. In the 120 sizes in the complete line, many, many parts are interchangeable. As shown here, one shaft is used in 39 sizes, one bearing in 55 sizes, one frame in 57, one packing in 40, one mechanical seal in 40, and one shaft sleeve in 40 sizes.

Reduces downtime. Parts interchangeability can mean big savings. When repairs or conversions are necessary, standardization can often drastically cut downtime. For example, all SESC pumps can quickly be converted from packed stuffing box to mechanical seal and vice versa using *stock* parts.

Cuts maintenance. If you know one SESC pump, you know them all. From the smallest to the largest the entire line is built to the same basic design. Maintenance men quickly become familiar with construction details. Their work is simplified and maintenance costs greatly reduced.

NEW PACKAGES & PRODUCTS

New Metallized Mylar

A feature of the recent National Plastics Exposition in New York City was a metallized Mylar, displayed by two distributors.

Foiltone Products, Inc., exhibited Mylar coated with aluminum to produce a hardy, flexible, and attractive packaging material. Coated under high vacuum, it is available in rolls up to 58 in. wide. On the smaller widths, a two-side coating is available. (142A)

Coating Products displayed Mylar bonded to supported and unsupported vinyl, and to paper. The result was a series of textured, gold and silver colored packaging materials that offered versatility in addition to its tensile strength. (142B)

Circle key numbers on Reader Service Card

Cheese-Flavored Wieners

Frankfurters with a cheese flavor are a product of Chicopee Provision Co., Chicopee, Mass. The Cheesefurters, as they are called, are made by adding about 20-25% sharp Wisconsin cheddar to the meat mix of beef, veal, and pork.

The cheese is added at the end of the conversion process to maintain correct particle size, but is blended long enough to completely distribute it. The cheese particles are not visible in the finished wiener.

Another Candy Flavor

Life Savers Corp., Port Chester, New York, has introduced another flavor to their famed line. Choc-o-Mint is a blend of chocolate and peppermint flavor. Ingredients are cocoa, sugar, corn syrup, salt, and true and artificial flavors.

Flexible Pouches for 3 New Items

Seasonings, chicken livers, and corned beef have recently appeared packaged in flexible pouches.

The seasonings and corned beef are packaged in foil made by Aluminum Company of America. (142C)

The corned beef is processed by Silver Skillet, Skokie, Ill. A ½ lb. of heat-and-serve meat sealed in a foil pouch that also serves as a cooking container. The pouch is packed in a solid sulphite carton.

American Beauty Macaroni Co. is the processor of the seasonings. It uses envelopes of .00035 Alcoa Wrap foil for a line of six mixes used to make spaghetti and macaroni sauces.

The third pouch is made of Durafilm, a polyethylene-cellophane combination made by Dobeckman Co. It is used by Sunnyland Packing Co., Thomasville, Ga. to package frozen chicken livers. (142D)

Circle key numbers on Reader Service Card

Colorful Food Basket

A plastic basket for packaging frozen meat, poultry, fish, and other items is manufactured by Gilbert Plastics, Inc. Called Quixee, the colorful container provides good product protection as well as eye appeal.

Processors advantages include increased production poundage since the open package permits faster freezing. They may be overwrapped on Hayssen or Package Machinery FA model wrappers. **Circle 142E on Reader Service Card**

proteins for grow-teens...

KELLOGG'S SPECIAL K® . . . CONCENTRATED HIGH-QUALITY PROTEIN IN DELICIOUS NEW CEREAL FORM . . . IS PROTECTED BY A SPECIAL RIEGEL WAXED GLASSINE

PROTECTED BY RIEGEL

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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Plain • Waxed • Printed
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introduces new

ELECTRO-PERMANENT MAGNETIC

VIBRATORY FEEDER

No other vibratory feeder like this! Eriez Magnetic "know-how" brings you the first complete line of Electro-PERMANENT Magnetic Feeders operating at 3600 CPM directly off an AC line. Just plug or wire them in.

NO RECTIFIER NEEDED

AND LOOK AT THESE ADDITIONAL HI-VI ADVANTAGES

Lower Maintenance and Operating Costs . . . Longer, Trouble-Free Service . . . Versatile Units Provide Broader Operating Ranges with Less Power Consumption . . . HI-VI units are Compact, Lightweight, Easily Installed, never need realigning . . . No Sliding or Rotating Parts to Wear, No Lubricants Needed . . . Noise Factor is reduced, working conditions improved . . . New type "Double Action" drive provides high operating efficiency with low operating cost . . .

Pat. Pending

ERIEZ HI-VI VIBRATORY FEEDER

Rapidly vibrating action moves bulk products in a smooth, even flow. Permits measured feed, from ounces to tons per hour. Eliminates pile-ups, spasmodic feeding. Extremely valuable for weighing, batching and proportioning operations. **Eriez HI-VI Vibratory Feeders** handle practically every type of bulk material . . . hot, damp, dusty, lumpy, abrasive, etc. Allows highly controlled feeding at greatly reduced costs.

Also offered is **Eriez HI-VI Unit (Bin) Vibrator.** Keeps materials flowing smoothly and evenly through hoppers, bins and chutes. Eliminates pile-ups, arching, bridging and sticking of dry materials . . . in lump or powdered form. Compact unit is easily installed.

ERIEZ HI-POWR MAGNETIC SEPARATORS

These products are the latest developments of Eriez Manufacturing Co., world famous producer of permanent-powered Magnetic Separators.

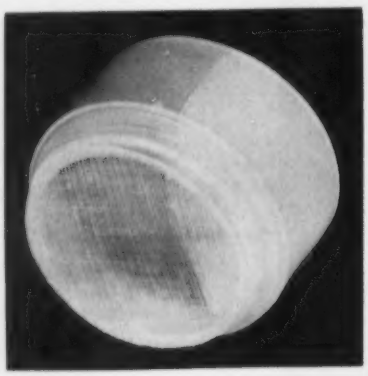
For full information on new HI-VI Vibratory Equipment, write Eriez Manufacturing Company, 1068 Magnet Dr., Erie, Pa.

Ready-to-Pour Pancake Batter Introduced

Ready-made pancake batter poured from a standard dairy-carton is the newest product of C. & C. Super Corp., New York City. Called Batter Up, the product is not a mix, but a prepared blend of ingredients made under the Leventrol process.

To make flapjacks, the housewife shakes the container, and pours the batter onto the griddle. Each 1 pt. container will make at least 24 3-in. pancakes.

Batter Up is distributed through dairies on a regular door-to-door basis, and also through super markets. Among dairies now handling the product are Sheffield, Daitch, Ferndale, and Mueller.



Inexpensive Poly Cap

A new heat-sealed closure for polyethylene containers offers three advantages: economy, protection against tampering, and (in some cases) eliminates the need for caps. The closure was developed and is being manufactured by Plax Corp., Hartford.

The seal is made by coating a barrier material (foil, cloth, or paper combination) with polyethylene. Heat-sealed to the container mouth, the closure is reported to be leakproof. Because it will not tear evenly, it will show any attempt to break or remove it.

It may be made transparent, opaque, colored, or pre-printed, depending on the barrier material.

Initial applications have been on hand-capped larger containers. No high-speed machinery for applying the closure has yet been designed.

Circle 144A on Reader Service Card

Bert and Harry Extra

A full-cell printed carrier is now used by Piel Bros, Brooklyn, New York. The carton is decorated with the brewer's bull's eye advertising theme in bright white, blue, and yellow.

"That cake won't fall"

Betty Crocker Yellow Cake Mix stacks square in rugged H & D corrugated boxes, arrives in retailers' warehouses ship-shape for shelf. Your product need extra protection? See H & D.

HINDE & DAUCH

Subsidiary of West Virginia Pulp and Paper Company

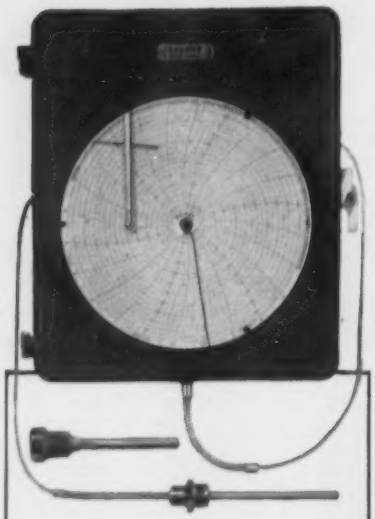
AUTHORITY ON PACKAGING • SANDUSKY, OHIO
13 FACTORIES • 40 SALES OFFICES

PALMER

MERCURY ACTUATED

recorders

Into this modern Mercury Actuated Recorder has gone all the skill of Palmer master craftsmen.



Readings are clearer, smoother and more precise than ever thought possible. In fact readings are so amazingly improved that maintenance is never needed under normal uses.

Recording Thermometers feature twelve inch die-cast aluminum case with black wrinkle or white satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 to 1000°F. or Equivalent in °C.

Send for Bulletin No. 45

Consult your Classified Directory

PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

Cincinnati 12, O.

Easy-Grip Milk Bottle Ready

Now available on a production run basis is Lamb Glass Co.'s Nu-Grip milk bottle. The bottle has a slightly concave surface on all four walls to add structural strength and prolong the life of the bottle. It fits standard filling and capping machinery and carrying racks.

The housewife is insured a better grip in handling the bottle. Also, appearance is preserved because of less scratching of the bottle sides.

Circle 146A on Reader Service Card

"Yankee" Bean Jar Debut

"Regarded by the processor as a distinctive "Yankee" package, a 16-oz. amber glass jar is being used by H. J. Heinz Co. for its New England-style beans.

The jar was selected for its resemblance to the earthen crocks used by early colonists. A red, white, and blue cap completes the package.

Recipe for the product remains the same as before.

Short-Skirt Crown Available

Claimed to be the first change in crown cap design in 60 years is a new model manufactured by Continental Can Co.'s Bond Crown & Cork Div. The new cap incorporates a shorter metal skirt with the same manufacturer's plastic liner.

In spite of the shorter skirt the new crown gives as much protection as the conventional one. It may be used in standard crowners and chutes with only minor modifications.

It requires no spot or cork and eliminates the problem of loose liners since the plastic is bonded directly to the metal shell. Concentric liner rings increase pressure and carbonation protection.

Circle 146B on Reader Service Card

Seasonings in Sifter-Jar

Three new products have been added to R. T. French Co.'s seasoning line. Packed in a tall sifter jar, the products are meat tenderizer, barbecue seasoning, and Italian seasoning.

An unusual feature of the cartoon-type label is a window near the bottom which allows the housewife to check on her supply. Snap-on sifter attachments are of polyethylene.

New Product Shorts

Four New Juice concentrates are now part of the Birds Eye line. They are tangerine, grapefruit and orange blend, and limeade. Containers are 6 oz. cans.

Poly Bags for Bread are now part of Dobeckmun Co.'s stock products line.

Baby Food addition at Swift & Co. is egg yolks and bacon packed in a 3½ oz. glass jar.

Combination Package of sausages and bacon is marketed by Coast Packing Co., Los Angeles.

Work Simplification

—*Continued from page 45*

subjects together, so that you can see what each is doing in relation to the others at any given instant.

Operation Chart

Finally, you employ a process chart to study what each of the operators' hand does, again classifying the details by using our symbols:

Operation (large circle)—when the hand is grasping, positioning, releasing, or using a tool.

Transportation (small circle)—when the hand moves, either empty or loaded, in any direction.

Delay (triangle)—when the hand is idle or waiting.

Inspection (square)—when the hand is used to check either quality or quantity.

To make an operator chart:

1. Pick a starting point in the cycle where it is easy to identify what both hands are doing.

2. Analyze the motions of one hand. On the chart describe briefly each detail of motion, then pick the symbol.

3. Now go back to the starting point and analyze the motions of the other hand.

4. Be sure to mesh the activity of the two hands so you can see how they work together.

Now take a close look at the chart and search out the possibilities for improvement. Perhaps one hand is used too much for holding during the cycle. This hand may possibly be freed for more productive work by using a jig or fixture.

Sometimes the hands are idle while waiting for the machine to go through its cycle. Is there a possibility of rearranging the sequence of work to better utilize both man and machine?

Can reaches be shortened? This may at first seem unimportant. But if you multiply the inches saved by the hundreds of times a day that the reach is made, you will find the savings in time and worker fatigue is well worthwhile.

In improving the details of the operation remember that the objective is to make the work easier and more productive; *not to speed up the worker.*

3. Application: This final phase of WSP is probably the most important. Yet is the one most often neglected. This is often due to the high euthusiasm that most supervisors have for the program following the education phase. This zeal throws us off guard. We form the impression that the program will now roll on by itself.

This is the point where many WSP's will sputter and die—unless a vigorous and interesting follow-up phase is provided. This phase should consist of:

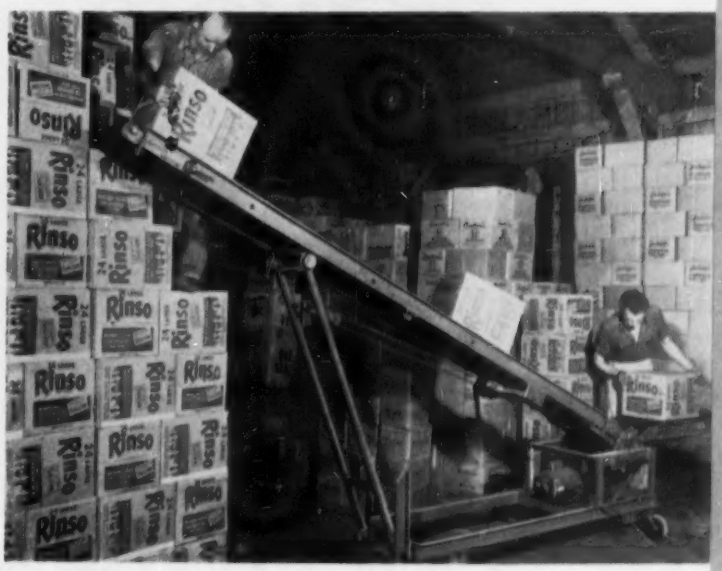
A. Advanced Training sessions run periodically to add to the knowledge of the supervisor insofar as tools and techniques of simplifying work are concerned.

B. Program of recognition for worthwhile simplification studies. Here you may find that a public pat on the back is worth much more to the worker than a cash award.

C. Group participation to study and solve perplexing departmental problems. These conferences should be scheduled at least once a month.

End (Resume reading on page 46)

Very Few CONVEYING PROBLEMS are New to Us . . .



Western type belt conveyer applied for stacking cartons in super market warehouse.

Every day some manufacturer runs head-on into a conveying problem that's new to him . . . a handling job that he hasn't had to do before. It may be a package of unusual size or shape, or there may be unusual characteristics regarding space, temperature or weight.

Whatever the problem might be, chances are, we've done something like it, somewhere, sometime before.

That's where experience pays off, and you get the benefit of fifty years of it when you buy Mathews Conveyers.

50 YEARS OF MC MECHANIZED HANDLING

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIV., MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . MATHEWS CONVEYER COMPANY, LTD. PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities.
Export Representative—Foreign Trade Division of New York Hanseatic Corp.

MATHEWS

This is CONTINENTAL'S new

dedicated to the production of

The product of the handsome building pictured here will be more rapid improvement of cans and packaging methods, for the immediate benefit of Continental customers.

This is the new multi-million-dollar research and development center of Continental's Metal Division, located in Chicago. It brings together under one roof 265 creative-minded scientists and engineers. With as many more technicians and assistants, they function as a closely knit team—in developing better materials, processes and machines—and in taking a fresh, new look at package design.

At their disposal are the most modern chemical, physical and engineering laboratories. Also contained in the 260,000 square feet of the center are complete pilot-plant facilities for checking out any individual proposal against considerations of cost, adaptability to present equipment, and good production practices.

Backing up the new center are other Metal Division laboratories at New York and Hayward, Calif., the Central Research and Development Division facilities in Chicago, which handle long-range experimental work, and 18 field laboratories across the nation.

research and development center

better cans and packaging methods

To all our friends who pack
FOOD...
our doors and facilities are always open to you

New developments in food containers will come to you faster than ever, now that our new Metal Division research and development center is working for you. Expect more ideas like our new cluster-beaded cans in #10, 46-oz., and #2½ sizes. Or our Gripstrip® on coffee, shortening and meat cans and our Eas-E-Namel for luncheon meat cans. Look for more engineering advances like our 423-HCM—capable of closing up to 1200 cans a minute.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

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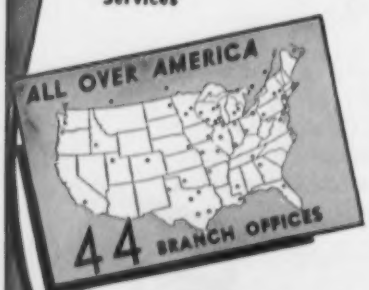
Sanitation Services FOR FOOD PLANTS

Engineered to Your Needs

★ Plant Sanitation Survey
★ Determination of Food Soils
★ Organization of Cleaning Schedules
★ Water Stabilization
★ Water Chlorination
★ Utensil Cleaning and Sanitizing
★ Heavy Equipment Cleaning and Sanitizing
★ High Temperature Equipment Cleaning and Sanitizing
★ Environmental Sanitation
★ Mold and Algae Control
★ Odor Control
★ Special Bactericidal Treatments
★ Special-Problem Laboratory Services



...re's a Klenzade field technician near you. ...services in helping you plan a complete ... Sanitation Program are yours without ...ligation. Write us now.

KLENZADE PRODUCTS, Inc.
BELOIT, WISCONSIN

Processors Probe Products

—Continued from page 69

in drained fruit when coated with cream, reported J. A. Kink, The Nulomoline Div., American Molasses Co.

Syrup is best removed by centrifuging. And by closely controlling the amount of syrup retained in the "drained" cherry, either single-cast or double-cast methods will produce good-quality centers.

Still another important factor is to set cast centers rapidly so that they may be removed from the molding starch as soon as they are cool enough to chocolate-coat. Cream centers made with basic fondant and a cooked bob syrup will set sufficiently firm so that they may be removed with minimum time and breakage.

Centers retain more moisture as the time of contact with the absorbent molding starch is shortened. Invertase depends on this moisture for rapid and maximum liquefaction.

Anthony Monti, Applied Sugar Laboratories, Inc., N. Y. C., reported results of studies on effects of storage temperature, pH, and various ratios of cream to cherry on the rate of liquefaction of cordial centers.

As expected, inversion at lower temperatures proceeded at a much slower rate, since the lower temperatures: (1) Reduce kinetic energy in sucrose and invertase molecules, (2) lessen solubility of sugars, and (3) make the syrup phase more viscous and reduce mobility of sucrose and invertase. Thus, there are fewer contacts between the molecules.

In studying effect of pH on inversion rate of 5:1-ratio cordials, samples were buffered (0.45% of citric acid and sodium hydroxide) prior to addition of invertase at pH's of 4.5, 5.0, and 5.5. Reducing sugars were checked after 1, 8, 23, and 42 days.

Results showed practically no change in invertase activity at these pH's. Increasing the ratio of cream to cherry reduces percentage of moisture in the combination, lowering the activity of invertase and amount of sugar that can easily dissolve. These factors greatly extend the time needed for liquefaction.

ON MOLDED CANDIES

In discussing use of molds in the candy field, John W. Vassos, Stephen F. Whiteman & Son, Inc., Philadelphia, pointed out that up to a few years ago, aluminum molds had a dull, porous finish, resulting in molding starch adhering to them and causing rejects.

It took a break-in period before this condition was eliminated, and many confectioners were forced to glaze-coat molds. But today highly polished aluminum molds have overcome this condition.

At present, all rubber mats for candy are of natural rubber. Experiments carried out with Neoprene—one of the four basic types of synthetic rubber—show good promise in molding high-fat centers. The Neoprene has excellent resistance to oils, fats, water, and heat.

Rubber candy molds are especially adaptable for cordial fruit centers, fudges, figaro, cast creams, crystallized creams, maple sugar, creams, and some jellies. Stock pattern molds are available to fit pump bars with standard centers for various depositors.

Confectioners can take a high-sugar fondant, re-melt it to 165F., and add frappe, color, flavor, citric acid, and invertase. Cream can be deposited in rubber mats, and, within 20 min., the centers can be removed.

After initial set, the candies are immediately de-molded to prevent sweating. Time for sweating to start depends on (1) amount of moisture and (2) reducing sugars in the centers.

Belts of rubber, Swedish steel, and oil cloth (with or without impressions) have been used in this country. Creams (mainly thin mints) are deposited on them, cooled within 15 min., and enrobed.

It is said that by this method a very thick cream (of various sizes) is now being continuously cast in rubber molds in Europe. Machines that extrude and cut marzipan in different shapes are also available.

As for chocolate molds, those made from tasteless polystyrene are gaining acceptance for making novelties. Tempered chocolate is placed in plastic molds to be cooled, rather than in tumbler units.

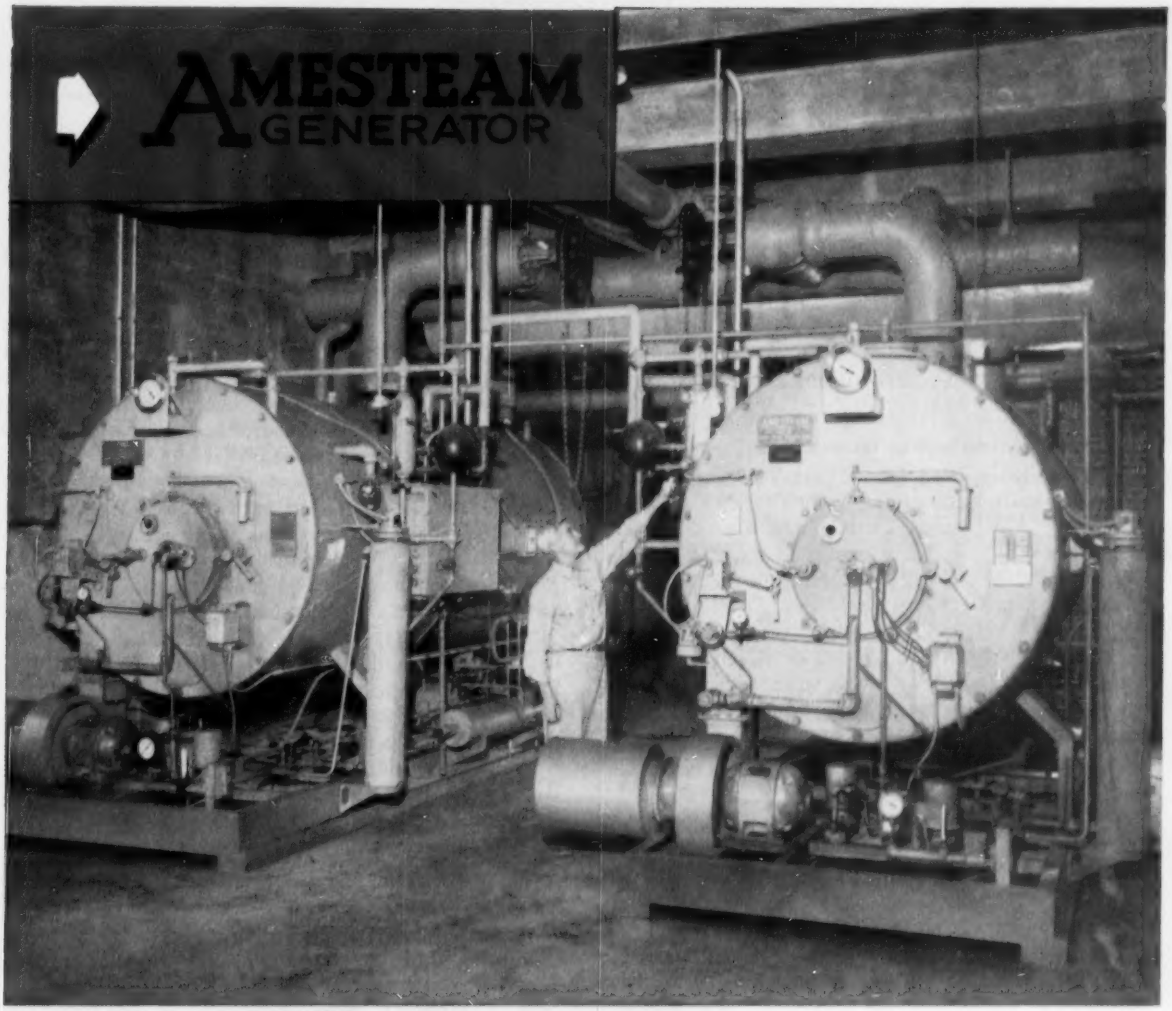
Plastic molds form small items like coffee beans, wafers, hearts, etc., no more than ¼-in. high.

Their advantages are low cost, ease of handling and storage, no rusting, and transparency. Disadvantages are insulation, chipping and breaking when cooled to low temperatures, and poor chocolate finish.

Confectioners can make their own molds. It is done in Europe and Australia.

Instead of using a metal mold in a shell plant, the processor may try a piece of aluminum foil shaped as a regular mold. The continental-type center could be deposited in the foil. And after the bottom of the center is put on and has set, foil in contact with the center can be cut, and the piece wrapped in same foil.

(Resume reading on page 70)



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INSIDE SCIENCE

The Vital Story of VITAMIN A

by Science Writer

We live in a golden age of the sciences!

In the science of nutrition discoveries of food elements and their action have resulted in the promise of better health for us all.

Let's consider vitamin A as an example.

A Capsule History. 1913 was the year. Two teams working independently with animal feeding experiments discovered that a diet which was good in all other respects but which varied only in the source of fat caused young animals to thrive or sicken as the fat was varied. The work of these teams (McCollum and Davis; Osborne and Mendel) led to the discovery of the food factor which we know as vitamin A.

Composition and Action. A pale yellow, oil-soluble substance, vitamin A is expressed in the chemist's shorthand as $C_{20}H_{29}OH$. It is necessary in the diets of men and animals to promote the body's growth and development. Vitamin A is a vital requirement in guarding the health of the eyes and skin, and for resistance against infection. It helps maintain the health of mucous membranes and other specialized epithelial and glandular tissues.

Vitamin A enters the body as a constituent of food. Or it may be created within the body when a precursor of vitamin A is eaten. A precursor is a food element with potential vitamin A *value* but no actual vitamin A *content*. For instance, many green leaves have a high vitamin A value but, paradoxically, contain no actual vitamin A. The body converts the precursor into the vitamin. The most common precursor of vitamin A is beta carotene, the natural yellow coloring of many foods, such as dairy products, cereal grains, carrots, alfalfa, etc.

When consumed in food vitamin A is absorbed primarily in the healthy intestine, is esterified in the intestine's walls and is carried as an ester in the lymph and blood to the body's storage depots. The liver, which has a large capacity for storage, contains about 90% of the vitamin A found in the body.

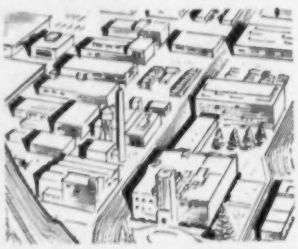
Isolation and Synthesis. It was not until 1937 that pure, crystalline vitamin A was isolated by Holmes and Corbett from fish-liver oil. Research in the synthesis of vitamin A was stimulated during the Second World War by the threat to natural sources in fish-liver oil. This work resulted in several processes to produce vitamin A synthetically. Of these, one of the most successful was evolved by the Roche research team headed by Dr. Otto Isler which was announced in 1947. Much of the vitamin A now used for pharmaceutical manufacturing and food fortification in the United States and many other countries of the world is produced by this process.

Vitamin A and beta carotene produced by the Hoffmann-La Roche synthesis have many positive advantages for food and pharmaceutical manufacturers. Among these are the complete absence of any "fishy" odor, taste, or after-taste; the reasonable and stable price; their stability, purity and uniformity and the assurance of a steady economical supply.

Vitamin A is described in the U. S. Pharmacopoeia as a fully acceptable compound for use in pharmaceutical products. The U. S. Food and Drug Administration has approved its use for the fortification of margarine and other foods.

Human Requirements. The Food & Nutrition Board of the National Research Council recommends that a daily allowance of 5000 International Units of vitamin A in the diet will maintain good nutrition of healthy adults in the U.S.A. The Board's recommendations vary above this for pregnant and lactating women, and below for infants and children. The adult dose used in therapy may vary from 50,000 to 200,000 units daily.

Production. At the huge Roche Park plant of Hoffmann-La Roche in Nutley, New Jersey, over 500 pieces of large-scale chemical engineering equipment are working constantly to produce the superior 'Roche' vitamin A. This production is so large that 'Roche' vitamin A comes from the plant actually by the tons. In fact, the entire needs of the food and pharmaceutical industries of the United States and Canada can be met from this one plant.



Again the Roche people, who have so often led the way in vitamin research and production, have made another contribution to the better health and well-being of countless millions.

This article is one of a series giving a brief resume of our present knowledge of those essential health factors—the vitamins. Reprints of this and other articles are available without charge. The Vital Story of Vitamin C was published previously and others are forthcoming. Send your request to: Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul St., W.; Montreal, Quebec.

ADVANCES IN TECHNOLOGY

Detecting Rodent Urine

The urease-Nessler's reagent procedure has been found applicable to detection of grain contaminated with rodent urine under natural conditions.

Test procedure comprises treating a large number of individual kernels on a spot plate made of clear plastic with buffered urease solution (pH 6.8) for 5 min., followed by addition of Nessler's reagent. This forms a yellow to orange colored complex with the ammonia liberated from the urea present.

Accuracy of differentiation between normal and contaminated kernels is increased by examination under an ultra-violet lamp, or by viewing the color with incandescent light which has passed through a blue or blue-green filter.

Accuracy of the method has been demonstrated by tests on samples containing known percentages of contaminated kernels.—*Cereal Chemistry*, 141-45, March 1956.

Storage of Dried Potatoes

Dehydrated potatoes need packaging at low levels of moisture to inhibit losses of SO_2 and non-enzymic browning.

An in-package desiccant reduces rate of SO_2 loss, and, when moisture contents of 2-3% are reached, SO_2 loss is prevented. At moderate storage temperatures the SO_2 content may actually increase if moistures are kept low enough.

A nitrogen atmosphere reduces SO_2 losses at high and medium moisture contents, except when the temperature is high. With moisture contents of 5% and moderate SO_2 levels, browning is unlikely during 52 weeks of storage at 82.4 F. or below, but at 100.4 F., browning may be serious in 38 weeks when 450 ppm. of SO_2 is present initially.

To prevent browning for 52 weeks at 100 F. high SO_2 levels (850 ppm. initially) are required or low moistures (3% or less). Inert gas in the package is also desirable.—*J. of Science of Food & Agr.*, 210-20, March 1956.

Storing Freeze-Dried Beef

Oxidative deterioration of freeze-dried beef may be largely controlled by storing in an inert atmosphere or at high vacuum. Then by rehydrating in oxygenated water, a beef of natural color results.

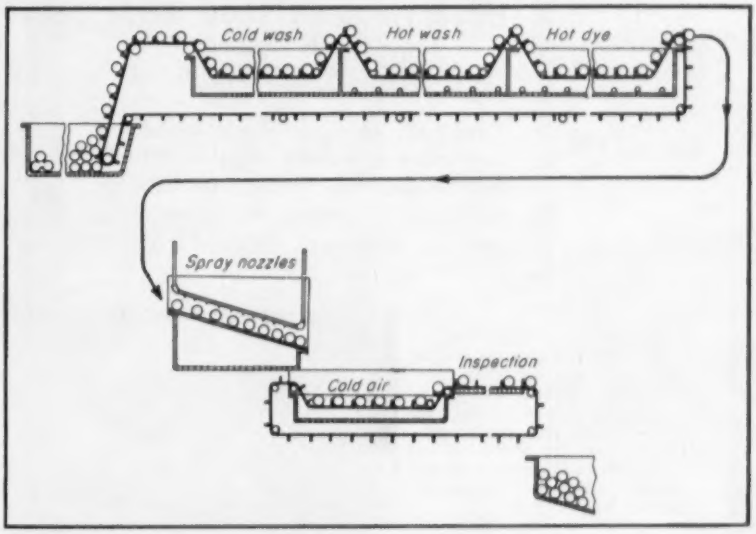
During freeze-drying of beef, oxymyoglobin is deoxygenated to myoglobin. In storage, and upon subsequent rehydration, this is readily oxidized to metmyoglobin, with an early development of an undesirable brown color.

During storage at 100 F. the dried beef will react chemically with relatively large amounts of atmospheric oxygen. This reaction is not coupled with the main deteriorative one—active carbonyl-amine browning.

The most unusual and most deteriorative reaction appears to involve oxidation of the protein fraction of the beef, which can account for 50-100% of total oxygen absorbed, and this can be prevented by the packaging in an inert gas, or under vacuum. —*Food Research*, 195-205, March-April, 1956.

Salt Substitute

Designed for use of people who must eliminate or minimize the sodium chloride content of their diet, a substitute has been patented that has the same taste characteristics and



Process Employs Pigment From Peel To Give Citrus Natural Color

Natural color pigments, extracted from the peel of mature and ripe fruit, are used in a patented process to give citrus fruits a pleasing color and increase their marketability. Also used in the process are suitable edible fat dyes.

Process comprises giving the fruit a cold wash, hot wash, hot dye bath, and spray of pigments, followed by air-cooling, and inspection before packing and storing (see illustration above).

In the case of oranges, the coloring material used in the spray tank is an aqueous dispersion of carotene and xanthophyll. This pigment can be extracted from orange oil by treatment with activated carbon which collects the yellow and orange pigments, especially carotene, in extremely high concentration.

Certain water-soluble, non-carotenoid pigments also are extracted from citrus rind, and act as an emulsifier for carotene. The color pigment may be further stabilized by addition of 0.01-0.10% by weight of naphthol-yellow S.

The spray bath contains 5-25% by weight of pigment, the remainder being water. Part of the water may be replaced by ethyl alcohol to form a more penetrating vehicle for the pigment. Coloring process can also be enhanced by the introduction of ethylene into the spray chamber.—U.S. Patent 2,739,897, March 27, 1956.

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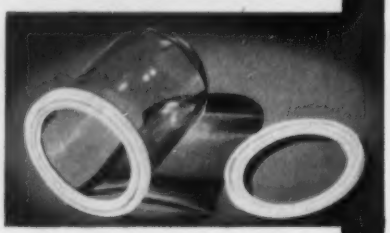

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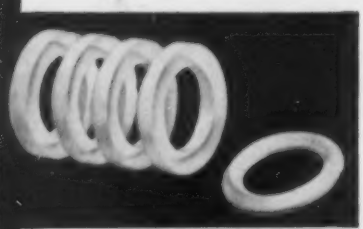

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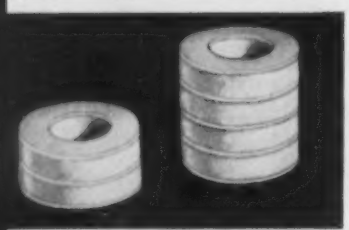

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physical appearance as ordinary table salt.

A small amount of NaCl may be added to the composition in cases where about 200 mg. of sodium is allowed in a restricted diet.

A specific composition contains about 40g. monocalcium glutamate, 120g. dextrose, 20g. tartaric acid, and 40g. calcium chloride. These are mixed and passed through a 40-mesh screen. The mixture is moistened with enough distilled water to form a friable lump which is granulated by passing through a 30-mesh screen.

After drying, the mixture is again screened, retaining the portion between 40- and 60-mesh. Finer particles are recycled to the granulation step. About 400g. potassium chloride and 120g. sucrose, which have been passed through a 40-mesh screen, are then added to the above fraction.

To minimize pickup of moisture, 5g. of calcium stearate are added to the mixture. The resulting composition is free from sodium.—U.S. Patent, 2,742,366, Apr. 17, 1956.

Detects Antibiotics in Milk

A simple accurate test for presence of antibiotics and other lactic bacteria inhibiting substances has been developed by U. of Wis. researchers.

The new test uses 2, 3, 5, triphenyltetrazolium chloride which is converted to formazene (reddish-pink compound) by growing bacteria. In performing it, milk is pasteurized to kill all growing bacteria, inoculated with cheese starter, and incubated about 2 hr. Then TTC is added followed by 30-min. more incubation.

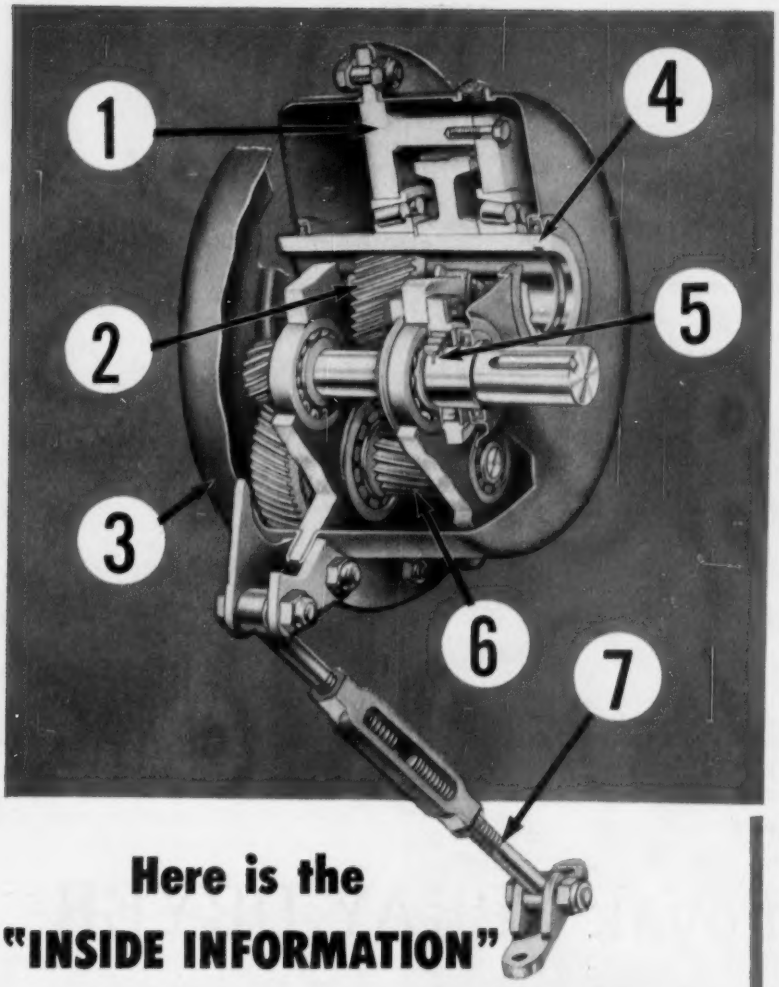
If antibiotics are present, the starter bacteria are inhibited and no color change results. If none are present, a reddish color develops.

With a pure lactic culture, the test detected as little as 0.04 units penicillin per ml., but not less than 4.0 units streptomycin. Quarternary ammonium compounds, iodine complexes and hypochlorites were also detected but at larger concentrations.—*What's New in Farm Services*, (Agr. Expt. Sta., U. of Wis.) 23-24, Jan. 1956.

Factors Influencing Life Of Stored Frozen Milks

Frozen milk tends to deposit both casein and lactose during storage, and the life of both unconcentrated and concentrated products is shortened by the separation.

By use of a dilatometer method developed for study of lactose crystallization, it was found that nuclei, degree



Here is the "INSIDE INFORMATION" on FALK ALL-STEEL Shaft Mounted Drives

Take a careful look inside the Falk all-steel Shaft Mounted Drive, and you will know why this newest member of the famous Falk family is ideal for applications where direct mounting on the driven shaft is desirable. It is the only drive in its field with all these superior "In-built" factors:—

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

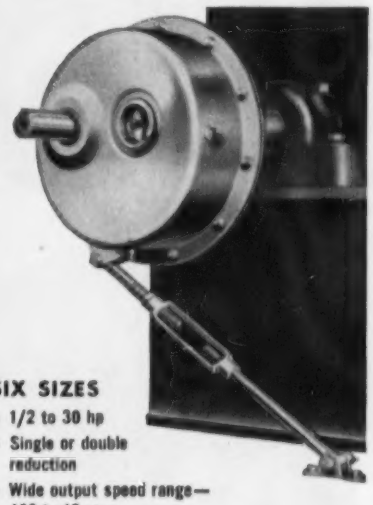
5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

Write to Department 247 for engineering bulletin, including selection and dimension details.

EFFICIENT SPEED REDUCTION IN LIMITED SPACE



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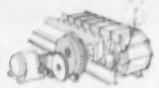
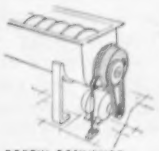
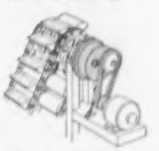
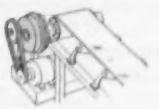
A FEW TYPICAL APPLICATIONS

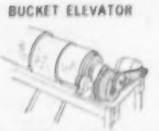

APRON FEEDER

LINE SHAFTING


SCREW CONVEYOR


BUCKET ELEVATOR


BELT CONVEYOR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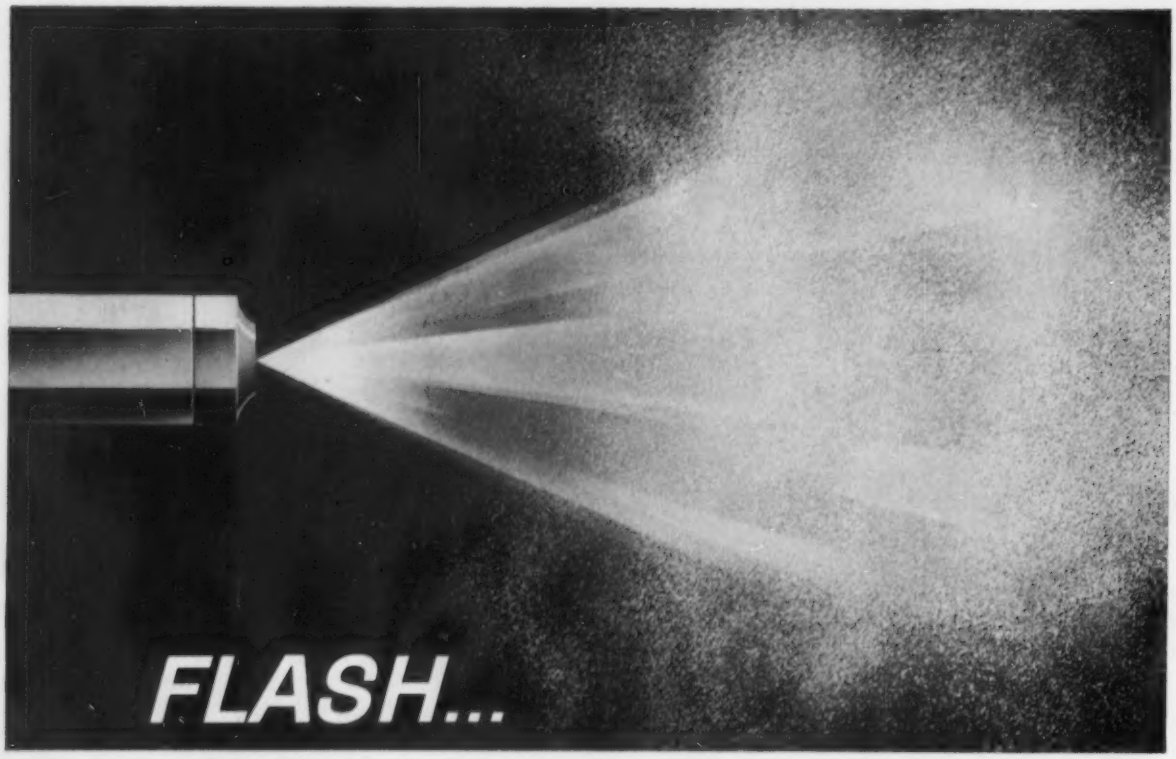

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A dry product is produced instantaneously in a *Buflovak* SPRAY DRYER. The liquid is atomized and sprayed into the center of a hot air stream. Evaporation occurs instantaneously and the dried product is removed from the heating zone so quickly that all its desired characteristics are retained. The operation is fast, sure and economical.

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- HIGH RECOVERY OF SOLIDS—by the most efficient collecting system
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50th Anniversary BLAW-KNOX 1906-1956

BLAW-KNOX COMPANY

Buflovak Equipment Division, 1637 Fillmore Avenue, Buffalo 11, N. Y.

of supersaturation, and temperature influence rate of lactose crystallization from frozen milk. Inorganic salts lower the degree of supersaturation by retaining more of the water unfrozen, and probably by increasing the solubility of lactose and interfering directly with its crystallization. Low temperatures increase the degree of supersaturation, but reduce the rate of crystallization.

Moderate heat treatment of milk (up to 150 F. for 30 min.) tends to increase storage life of frozen milk, but severe heating (180 deg. for 30 min.) greatly decreased storage life as did storage of the milk at 35 F. before freezing.

Effectiveness of added solutes, such as sugar or glycerol, in increasing storage life is due to their retaining water in the unfrozen state, thus diluting the salts, and lessening the pH changes, and to their increasing the viscosity of the liquid phase. All of these factors tend to stabilize casin and avoid its separation.—*Canadian J. of Technology*, 131-51, March 1956.

Preserving of Bananas

By successive steps of evaporation and refrigeration a patented process claims to retain the natural color, fresh flavor, and food value of bananas while greatly reducing their bulk and weight.

Bananas are first peeled and cleaned of seeds and outside surface fiber. They are then placed on a grill which moves them through the specially designed apparatus. In the first compartment, which is hermetically sealed, the fruit is subjected to action of steam at relatively high pressure for a short time.

Passing to the second compartment, the softened mass is turned continually by a screw so that all parts are equally subjected to steam at atmospheric pressure for a longer period of time than in the first section. Holding time depends on desired concentration of the bananas.

In the third part of the apparatus, the concentrated fruit is refrigerated to a temperature of about 20 F. It is then molded into a convenient size and quick frozen. If desired, it may be frozen on a stick and dipped in chocolate.—U.S. Patent 2,741,560, April 10, 1956.

Role of Lipids in Baking

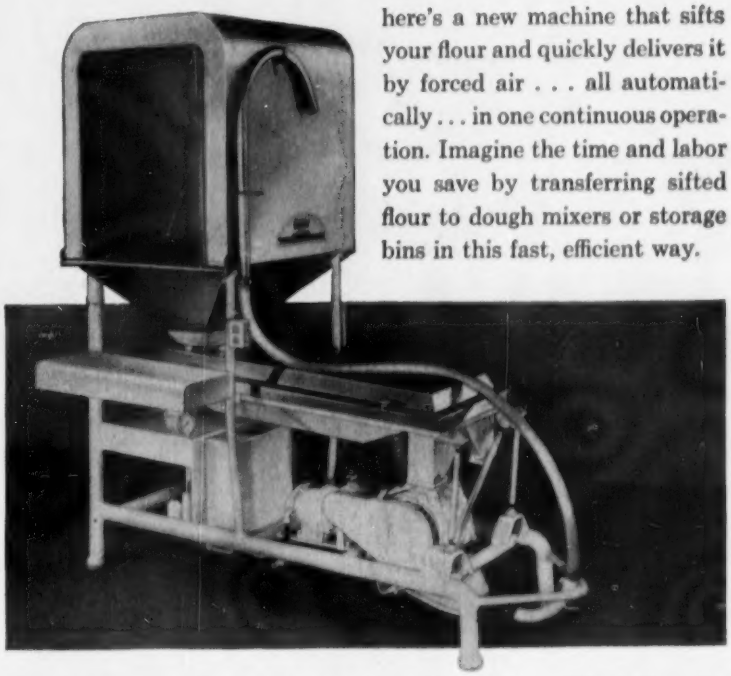
Flour lipids seem to play an important part in bread baking and to be involved in both oxidative improvement of flour and in the crumb softening type of bread improvement.

The defatted flour—extracted with

operation "airmatic" with the

DAY RO-BALL AIRMATIC...

here's a new machine that sifts your flour and quickly delivers it by forced air . . . all automatically . . . in one continuous operation. Imagine the time and labor you save by transferring sifted flour to dough mixers or storage bins in this fast, efficient way.



Flour is sifted in the popular Ro-Ball Sifter (one component of the Ro-Ball Airmatic) and is then blown to another point by a low-pressure air system, which requires only 4-12 psi and 10 cfm to convey 100 pounds of flour per minute. No objectionable dusting. Low air consumption permits use of your existing air lines. Sanitary construction throughout. For complete information write for Specification Sheet B-105RA.

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KELCOLOID hydrophilic colloid

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lengthens shelf life of French and Salad dressings, meat and barbecue sauces

You produce stable and uniform emulsions of superior flavor release and natural color with Kelcoloid. This easy-to-use hydrophilic emulsifying colloid improves consistency, gives smoother textured dressings of higher gloss.

for French dressings:

Extensively used in French dressings, Kelcoloid gives greater emulsion stability and markedly increases shelf life. Even when dressings are subjected to either high transit and storage temperatures, or refrigeration, Kelcoloid protects against body breakdown and separation.

for salad dressings and food spreads:

For softer, smoother texture add Kelcoloid to produce a desirable body that resists cracking and oil separation even on long standing.

for barbecue, meat, seafood, and mustard sauces:

With Kelcoloid you produce a properly stabilized product with optimum body and clean full flavor. Shelf life is increased for Kelcoloid maintains uniform emulsions longer.

For finer food emulsions Kelcoloid is well worth your immediate evaluation.

YOURS ON REQUEST: Free Kelcoloid Sample and Technical Bulletin, fully describing application of Kelcoloid in food emulsions, yours without obligation. Write today.

KELCOLOID®
a product of **KELCO** company

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20 N. Wacker Drive, Chicago 6, Ill.
530 W. Sixth St., Los Angeles 14, Calif.
Cable Address: Kelcoalgin—New York

ether or carbon tetrachloride—is whiter than unextracted flour, and changes little in dough-making qualities during storage. Bread made with such flour with only yeast, salt, and water, is superior in volume, texture and color to bread similarly made from unextracted flour.

When shortening is added to defatted flour doughs, however, the bread will have poorer volume and crumb softness, while unextracted flour breads made with shortening have improved volume and softness of crumb.

There is good evidence that oxidizing improvers act on flour lipids, and it is possible that some lipid constituent is necessary for oxidation and the superior doughs and bread properties that result from it.—*J. of Science of Food & Agr.*, 72-87, Jan. 1956.

Flour Bleaching Agent

Newest agent to meet U. S. standards for bleaching flour is ClO_2. In terms of available Cl, it is superior to either elementary Cl or NCl_3.

Early experience showed that the compound cannot be relied upon for full bleaching because maturing action is likely to be excessive if enough is used to reduce carotenoid pigments to the desired limit. But when used in combination with benzoyl peroxide, both bleaching and maturing objectives are realized.

The new agent is an irritating gas which cannot safely be compressed in tanks. For safe use in treating flour it must be highly diluted with air.

Preferred form of supplying ClO_2 is the crystalline hydrate, prepared by absorbing the gas in cold water. The crystals are filtered off, packed wet, and frozen into a solid block. The product may be stored for months at 0 F. without appreciable loss by evaporization.

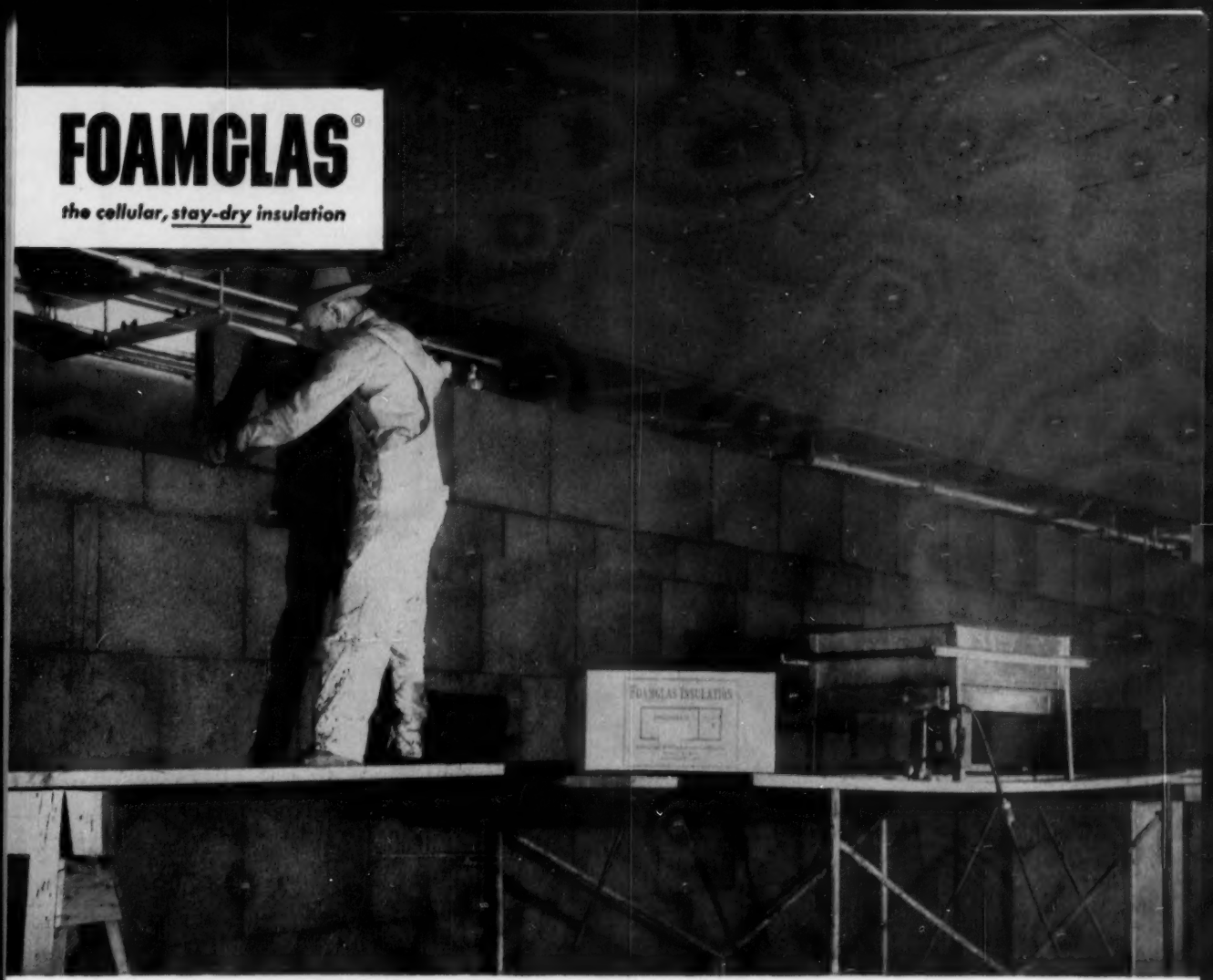
Solutions of ClO_2 can be made by placing the hydrate-ice in water and agitating gently. Such solutions can be metered to stripping towers where countercurrent streams of air pick up the gas and transport it through hose to flour agitators.

Commercial dispensers have been designed for this purpose which permit individual control of gas to each flour agitator.—*Cereal Science Today*, 18-22, May 1956.

Recovering Coffee Aroma

Capturing the aroma of coffee as it is being roasted and ground, then incorporating it in spray-dried coffee powder is the basis of a recently patented process.

In specially designed apparatus the



In new —20°F. hardening room . . .

Carnation cuts construction costs with free-standing insulating wall of FOAMGLAS

The Carnation Company, Oakland, California, built this free-standing insulating wall entirely of FOAMGLAS. The free-standing wall enabled them to cut construction costs for their new —20° F. ice cream hardening room. FOAMGLAS made this possible because its rigidity and unusual strength enabled it to function as *both* insulation and structural wall. Not even temporary supports were needed.

Carnation also used this unique cellular glass insulation for all other walls plus the floor and ceiling of the room. Its sealed glass cells mean FOAMGLAS stays dry, its insulating performance stays constant. That assures dependable temperature control and an end to the headaches and expense of insulation replacement. What's more, heavy loads can't hurt the extra-strong floor insulation.

You, too, will find this unique, *stay-dry* insulation the perfect answer for refrigerated spaces, piping and equipment. Completely inorganic, FOAMGLAS can't warp, shrink or swell . . . is vermin-proof and fireproof as well. Write us today for a free sample and up-to-date literature covering your specific needs.

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Pittsburgh Corning also manufactures PC Glass Blocks

With this simple test you can quickly demonstrate for yourself the remarkable compressive strength of FOAMGLAS (over 7 tons per square foot). Write now for a free sample and complete directions for this and five other simple tests . . . easily performed right in your own office.

YOU CAN MAKE THESE 6 VINYLS SAFER AND BETTER AT LOW COST!

VINYL CROWN LINERS with a definite advantage in pressure retention over cork liners...

VINYL COATED CONTAINERS —that are nontoxic and can be used for all hot or cold foods and liquids...

VINYL PLAYPEN TOYS —that are nontoxic... safe for baby to teethe on...

FOOD JAR VINYL SEALING RINGS that are fast and easy to manufacture...safe for contact with both fatty and nonfatty foods...

VINYL FILM PACKAGES —excellent for meat wrappings and new type of single portion, ready-to-use food packages...

POLYVINYL ACETATE ADHESIVES that increase production rates several hundred per cent over ordinary pastes and glues and meet F.&D.A. requirements for food packaging.

WITH PFIZER CITROFLEX® A-4... nontoxic, odorless plasticizer

Citroflex A-4 is accepted by the Food and Drug Administration, the Bureau of Animal Industry, and the Office of the Quartermaster General as a component of plastic film wraps **for both fatty and nonfatty foods.** Its toxicological safety is unsurpassed.

It's odorless, and it makes vinyls outstandingly low in extractable taste, too.

It has excellent viscosity stability and superior heat stability in polyvinyl chloride plastisols... **unusual efficiency** as plasticizer for synthetic resin adhesives and polyvinyl chloride coatings for paper board products. Lower amounts are needed than with other plasticizers to achieve the same heat-sealing temperatures.

Vinyl coatings formulated using Pfizer Citroflex A-4 have **high gloss finishes.**

Manufacturing Chemists for Over 100 Years

Pfizer

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operation is carried out continuously as follows: An inert gas, such as nitrogen, is passed over freshly roasted and ground coffee where it picks up the volatilized aroma substances. Then an extract is prepared from the dearomatized coffee and spray-dried to a fine powder. Latter is caused to fall in a cascade-like shower of separate particles through the aroma-charged gas.

The powder is maintained at 60-80 deg. C. and the aroma-charged nitrogen at a higher temperature, but not to exceed 150 C. The aroma substances condense on the cooler particles of powder under conditions that insure stable binding and uniform distribution.

Gas and powder are separated in appropriate apparatus, the former being returned to the roasting chamber to pick up a new load of aroma substances. Powder is immediately packaged for commercial use.—U.S. Patent 2,738,276, March 13, 1956.

Beer Pasteurization, Plate vs. Bottle

Beer pasteurized in plate-type heat exchangers, and thereafter handled in sterile lines and filled into sterile bottles has been shown to have satisfactory biological stability.

Effect of this method on other properties, were determined on beer pasteurized for 27 sec. at 156.2 F. in an A.P.V. apparatus, type HX, with a capacity of 42.5 bbl./hr.

Beer first passed through a regenerative heating section, then a section employing hot water at 163.3 F. and a 7-in. dia. holding cell. Final chilling was obtained in a brine-cooled section. Maximum pressure on the beer was 92.4 psi., sufficient to keep CO_2 in solution at all times.

In four comparative trials, with the same beer pasteurized in bottles, the plate pasteurized product showed no differences in composition except for a lowering of pH of about 0.1 unit. Bottle-pasteurized beers retained their clarity slightly better—111 days on the average, compared to 105 days for plate-pasteurized beers. Taste tests showed no significant differences.—*Brygmesteren (Danish)*, 13 (4), 85-95, 1956.

New Cheese Making Method Proved Out Commercially

Good quality cheese with all the characteristics of cheddar made by the standard (old) procedure can be produced commercially by the new USDA Short Method (FE Aug. '53, 125, and FE Nov. '54, 181).

WHEN 1 OZ. PACKAGE OVERWEIGHTS CAN MEAN $ $ LOST . . . THERE'S NO SUBSTITUTE FOR

. . . EXACT WEIGHT

Many products, such as cartoned ice cream, are sold on a "large volume—small profit" basis. Overweight packages in a day's production can wipe out your profit.

EXACT WEIGHT Scales checkweigh your package production accurately and quickly—they are used extensively by dairies to control all their packaged products.

EXACT WEIGHT'S easily read dial leaves no margin for error. On Model 103, shown above, one inch travel equals one ounce. Adjustable damping action and short lever movement quickly stop pointer at Exact Weight for a fast and accurate reading.

Model 103, shown above, is recommended for 1 pint and 1 quart packages. Model 273, at right, is recommended for ½ gal. and 1 gal. packages. Model 940, end tower model, for fast, accurate weighing of 5 gal. containers.

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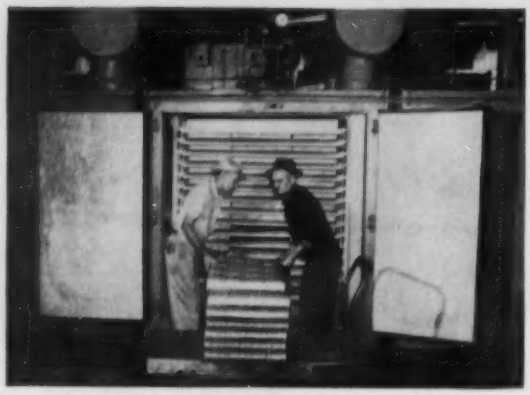
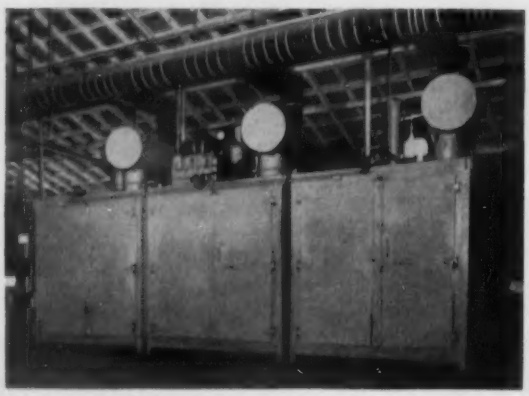
PRESSURE PLATE FREEZERS

(U. S. Pat. No. 2,669,069) (Canadian Pat. No. 494,746)



AMERIO INSTALLATION PLANT CITY STORAGE CO.



AMERIO FREEZERS ARE PREFERRED FOR MEAT — FISH PRODUCTS — FRUITS — POULTRY — PRE-COOKED FOODS VEGETABLES.

More Dependable — More Versatile — Faster-Uniform Packages — More Economical — with Full Flavor and Quality Retention.

Designed for Ammonia, Brine or Freon Refrigerants.

Amerio

Contact Plate Freezers Inc.
Union City, N.J.
"It's the Contacts that Count"

Send For Illustrated Brochure

But certain precautions must be observed. For example, high pH values were consistently found in commercial cheese made by the short method when thermoduric starter, strain S.D.3 was used. This cheese scored second grade and developed fruity and unclean flavors.

The problem was solved by substitution of strain TS2 thermoduric starter (using 2% normal lactic starter, 1-2% TS2). With this combination, no difficulty was experienced in obtaining milling acidities of 0.30-0.35%.

Another problem was the slow maturing at 40-50 F. This was traced to overheating of curd (112-116 F.) during the second cooking. It was overcome by limiting temperature to 110 F. and reducing cooking time to 5-10 min.

The method lends itself to mechanization and has reduced overall labor requirements by approximately 33⅓% in one plant. It has proved successful in those plants which persisted through an initial adjustment period in which their personnel gained the necessary experience.—*The Australian Dairy Review*, Feb. 1956.

—End—

Liquid-Ferment Baking

—Continued from page 58

on bottom of vat, rotates about 1 in. from tank bottom. Agitation is also facilitated by six 10-in. baffle plates mounted half-way up the sides of the fermenter.

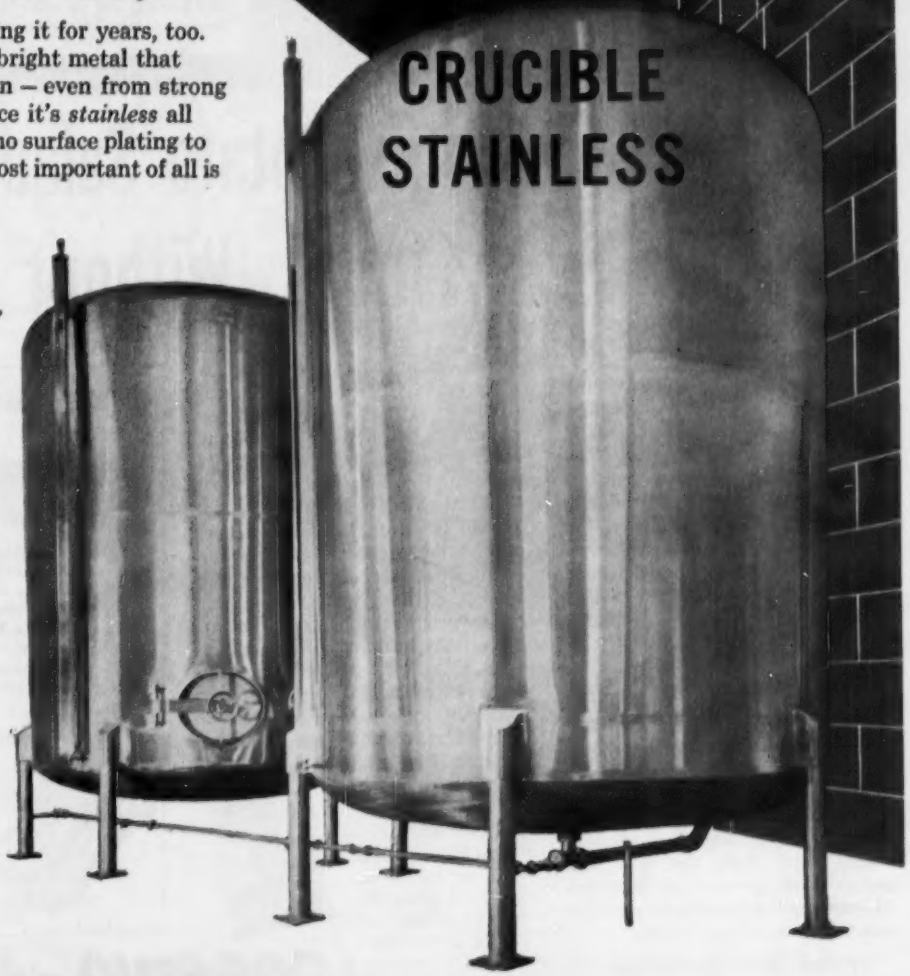
A portable sifter feeds dry ingredients into the fermenting vat.

After water is metered into fermenter, all enrichment materials and milk solids are introduced. Then the following percentages of other ingredients are added: Yeast (40), sugar (30), salt (30), yeast food (60), soy flour (⅛), wheat flour (¼), monodiglyceride (1/10) latter three on flour basis.

Ingredients are thoroughly blended, then up to ¾th of the water (at a temperature to set the ferment at 90-93 F.) is metered into the batch. Ferment is now allowed to work 4 hr., in which time the temperature rises about 10 deg. This period was selected as a safety measure—to make up any lag in the 2½ hr. when fermentation is normally completed.

Balance of water is metered in cold, along with those ingredients—balance of yeast and yeast food, propionate, potassium bromate, and fungal enzymes—not involved in the preparation of the brew. Ferment, in this case, serves as a vehicle to get them

drinks that "hit the spot" *are flavor-protected with*



These gleaming stainless steel tanks, made by the Metal-Glass Products Company, Belding, Michigan, protect the delicate flavors of cola drinks. And they help keep them fresh and pure.

They'll keep right on doing it for years, too. For stainless is a tough, bright metal that resists wear and corrosion – even from strong cleaning agents. And since it's *stainless* all the way through, there's no surface plating to chip or wear away. But most important of all is the fact that stainless is inert . . . *it never adds unwanted flavor to beverages – even dairy products.* And, of course, stainless is a snap to keep spotlessly clean.

That's why it's *standard equipment* for tanks, pasteurizers, bottlers, piping, fittings—*everywhere* that food and metal come in contact. It's the most *practical* choice you can make. So next time you're buying equipment make sure it's of Crucible stainless steel. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh* 30, *Pa.*

CRUCIBLE first name in special purpose steels

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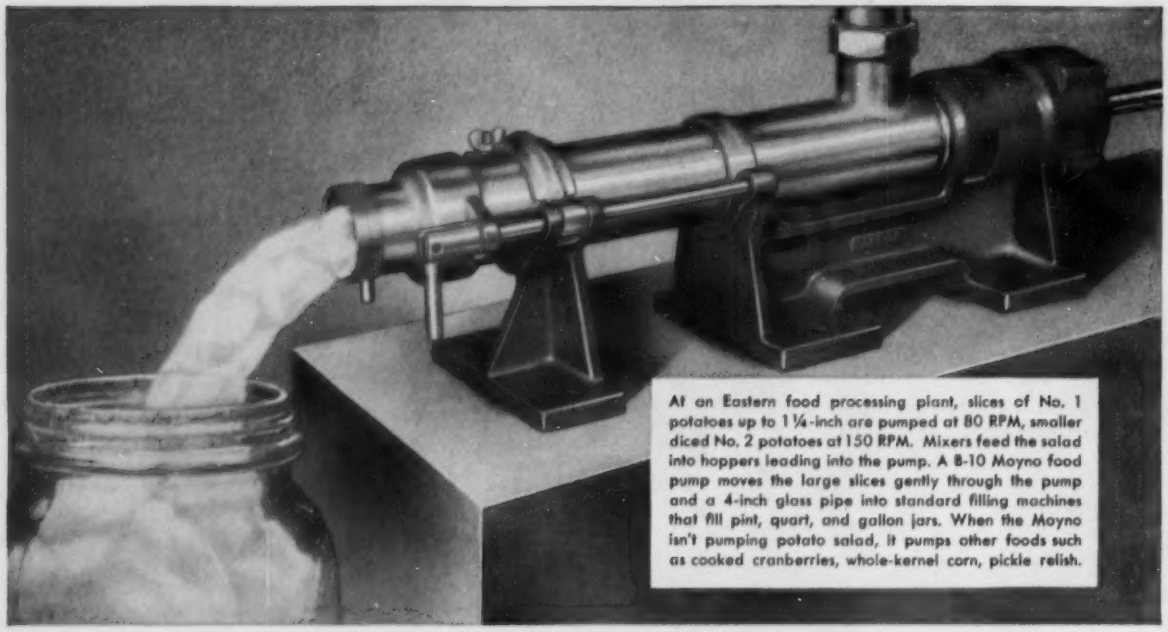


At an Eastern food processing plant, slices of No. 1 potatoes up to 1¼-inch are pumped at 80 RPM, smaller diced No. 2 potatoes at 150 RPM. Mixers feed the salad into hoppers leading into the pump. A B-10 Moyno food pump moves the large slices gently through the pump and a 4-inch glass pipe into standard filling machines that fill pint, quart, and gallon jars. When the Moyno isn't pumping potato salad, it pumps other foods such as cooked cranberries, whole-kernel corn, pickle relish.

This Moyno® Pumps Potato Salad With Slices Up To 1¼-inch...Without Crushing!

The Moyno can pump potato salad and a lot of other materials without making mush out of them—because of the unique *progressing cavity* principle.

Moynos have no valves and pistons, no vanes or other devices that cause churning and turbulence. The Moyno has a simple screw-like rotor turning within a double-threaded stator. This design creates cavities which progress smoothly toward the discharge end of the pump, carrying the material being handled. The material is not squeezed or churned.

Pumps Practically Anything

That's why the Moyno successfully handles such hard-to-pump materials as non-pourable pastes, frits, plaster, highly volatile liquids, and materials containing large particles, such as potato salad, fruit, cherries, chow mein—even oysters! In fact, the Moyno handles practically anything that will pass through a pipe.

Many Other Advantages

Moynos pump many hard-to-pump materials with a minimum of abrasion and wear. Many plants have adopted Moynos simply because they last so long.

Moynos provide positive displacement. Moynos can pull up to 29 inches vacuum while discharging under pressure. Big Moynos deliver up to 500 gpm; can provide pressures up to 600 psi in the smaller frame sizes. They even get up to 1000 psi momentarily.

The Moyno is reversible—it pumps equally efficiently in either direction.

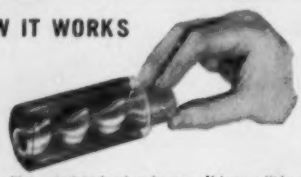
With the Moyno, accurately metered flows are obtainable by regulating operating speed.

Moynos are trouble-free. They are self priming; won't cavitate or vaporlock. There's just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain. Moyno pumps are easy to take apart for cleaning.

Write For Bulletin

You may save a good deal of money or solve a tough problem by finding out about this simple, versatile pump. Write for Bulletin 30FE.

HOW IT WORKS



Rotor is like a stretched-out corkscrew. It turns within a stator that has a double internal thread. Thus rotor and stator form closely fitted cavities. As the rotor turns, these cavities progress evenly toward the discharge end of the pump without closing up. That's why the Moyno easily handles materials without crushing, churning, or aerating; and why it can handle so many different things—solids in suspension, pastes, abrasives, highly volatile liquids, tars, soaps, caustics—even cement and plaster.

FOR DESIGN ENGINEERS

Moynos are available in small sizes and special designs for use in automatic washers, drink dispensers, sprayers, oil burners, machine tools, gasoline pumps, and a wide variety of other equipment. If you are designing machinery, we'll work with you, in confidence, to integrate pump design with your problem.

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Fractional and Integral HP Motors

Desk, Window, and Household Fans

Hoists and Cranes

Moyno Pumps

Propellair Industrial Ventilating Equipment

into the dough without separate scalings.

Ferment is pumped through sanitary lines to a 3,500-gal. stainless steel storage vat, where it is gently cooled to 50-58F. The vat is equipped with a 3-bladed (6x24-in.) vertical agitator, with motor drive geared for speeds varying from 35 to 80 rpm. A barometric, pressure-type level indicator gages volume in gallons.

Cold water from an ammonia-refrigerated tank is circulated through coils in the lower half of the storage vat to cool the ferment.

Throughout storage, the ferment is constantly agitated, and yeast enzymes are stimulated into readiness by constantly feeding in sugar at a rate of 1½ oz./hr. for each 100 gal.

Some of the ferment is also pumped to a 300-gal. tank, where it is altered for making rye and French breads.

Storage tanks are drained and thoroughly cleaned at the end of the week. Fermenting tank, sanitary lines, and pumps are cleaned daily. As a precaution, sewer drains are capped when vats are in use to prevent a leaky valve from letting the ferment escape down the drain.

The ferment is now ready for dough mixing. It is gravity-fed to the floor below, where it goes into portable, stainless steel measuring vats (50 gal.). From here, it is further gravity-fed into mixers on the next floor down, along with flour from a scale hopper.

Also added to mixers are sugar, melted fat, water, and the balance of the salt. Dough gets a severe mixing for 7-8 min. to 79-80F., after which it is discharged into troughs for a 30-min. floor-time. It then goes to the divider, overhead proofer (7 to 9 min., depending upon room temperature), cross-grain molder, and final steam proofer (for 60 min.).

"Much Simpler"

The process may seem difficult. Actually, it's only different. Once set up with properly trained personnel, it's a much simpler method of making bread.

Sponge time, percentage, and temperature are chiefly responsible for controlling the age of sponge used to make bread in the conventional way. But this is not so with bread made with liquid ferment. In this case, age is controlled by varying the amount of sugar going into the ferment.

Adding more sugar to the ferment and less at the dough stage will produce an "older" bread. A "younger" bread is made by reducing sugar in ferment and increasing it in the dough stage.

End *(Resume reading on page 59)*

Hoerner Boxes, Inc.
has been keeping company with
Armour for *25 years...*

"Pleasant as a picnic" could describe Hoerner's 25 years with Armour & Company. Tins of Armour Star canned meats travel from three packing plants to supermarkets neatly sandwiched in sturdy Hoerner corrugated containers. And Hoerner's dependable service keeps shipments on time.

If your packaging operation is no picnic, call in a Hoerner Packaging Engineer. His specialty is slicing through problems.

Phone or write the office or plant nearest you.

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GENERAL OFFICES—600 Morgan St., Keokuk, Iowa • PLANTS—Keokuk, Des Moines and Ottumwa, Iowa Sand Springs, Oklahoma • Minneapolis, Minnesota • Fort Worth, Texas • Sioux Falls, South Dakota Fort Smith and Little Rock, Arkansas • Cajas y Empaques Impermeables, S. A., Mexico City D. F., Mexico

another carload of reasons

for using Atlas food ingredients

Atlas sorbitol and emulsifiers improve taste, texture, keeping qualities—make your products sell better

CANDY conditioned with sorbitol retains its original softness and texture longer. Sorbitol modifies the crystal structure of mixed sugar systems, making cream centers smoother and fondants whiter and lighter.

DIETETIC SOFT DRINKS gain new taste appeal with Atlas sorbitol . . . where it is used for flavor dispersion and bodying purposes. Only a small amount improves "mouth feel," making a big difference in the consumer acceptance of the soft drink.

SHORTENING with Atlas emulsifiers will produce consistently superior cakes, toppings, icings, etc. . . . *all the time.* Atlas emulsifiers have an optimum balance of monoglyceride (imparts excellent cake baking and water absorption properties) and diglycerides (provides additional tolerance . . . assuring consistently superior performance under all conditions).

MANY OTHER FOODS—baked goods, shredded coconut, icings, ice cream, and scores more—are moving off market shelves faster, thanks to quality improvements by Atlas food ingredients.

SORBITOL—Both a superior conditioner and a wholesome food ingredient, helps retain the tender taste and softness of foods containing sugar. Mildly sweet, sorbitol blends well with other ingredients.

ATLAS EMULSIFIERS include bread emulsifiers combining high monoglyceride content with diglyceride "bonus," as well as special emulsifiers for a wide variety of food applications.

Interested? We've helped many manufacturers gain the outstanding advantages of Atlas ingredients . . . and we'd be glad to lend you a hand, too. Write for samples and technical data.

FOOD INDUSTRY DEPARTMENT

ATLAS

CHEMICALS DIVISION
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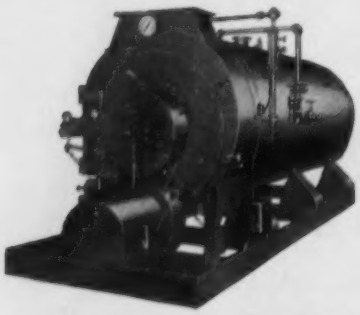
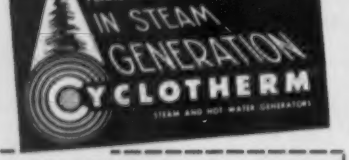


1. FUEL COSTS Cyclotherm Cyclonic Combustion means just what it says — controlled fuel and air, whirling at 200 mph, forming a cyclone in the furnace! This high velocity burning assures maximum efficiency in combustion and heat transfer, resulting in lower fuel consumption.

2. MANPOWER COSTS A fire without a fireman! Electronic controls operate the Cyclotherm safely and automatically. Smaller models cycle on and off as steam is required. On larger models, precision modulation coordinates the fuel-air ratio to the load demand, from 30% to 100% of rated capacity.

3. INSTALLATION AND MAINTENANCE COSTS Cyclotherm is factory assembled and factory pre-tested. All you do is make five simple connections. 50% maintenance savings are not uncommon. Return tubes cleaned in minutes with no removal or replacement of refractories. No standby unit needed.

And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.



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Company_____

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City_____ Zone____ State_____

Dietary Specialties

—Continued from page 59

ing and cooling of the curd follow the same procedure as in cultured buttermilk. Finally, the milk is bottled in quart containers.

Lactobacillus Concentrate

The *acidophilus* concentrate is made by culturing 200 to 400-gal. batches of pasteurized (145 F.), skim raw milk.

And after sufficient time elapses for growth of the pure *lactobacilli*, curd is "dropped" with an edible acid. Whey is run through a centrifuge (Sharples Super), where a single pass separates *lactobacilli* from liquid. Capacity of the 26,000-rpm. centrifuge is about 5 gal. of whey per minute.

Resultant concentrate averages 90 to to 100 billion organisms/ml. and is ready for addition to the consumer product.

A specially concentrated *acidophilus* product, called Cams, is a blend containing a small amount of curd (to give it a milk-like appearance). It is bottled under laboratory-controlled conditions in 5-oz. containers, held at 33 to 34 F., and sold by prescription through the drug trade.

Tailor-made for those preferring a Bulgarian-style cream buttermilk is another product, Kazol. Containing 2% butterfat, it is made by running standardized milk through a separator to cut butterfat content.

In the next step, the milk is heated ½ hr. at 180 F. in a pasteurizer, then chilled to 70 F. Batch is inoculated with a 1% culture of *Streptococcus lacticcus* that is carried by the laboratory.

Following an 11-to-15-hr. incubation, milk is water-cooled from 70 to 50 F. in the same jacketed vat. Curd is finally broken up by vat's agitator, then *lactobacilli* concentrate is added, and the buttermilk is bottled in quart containers.

Enzyme-Modified Milk

Now available for infants and geriatrics is a modified milk, Enzylac. This is enzyme-treated to make its proteins more readily digestible for these special dietary groups.

In the process, raw milk is treated with a powdered form of proteolytic enzymes extracted from the pancreas of meat animals. (It is made by Armour and Company for American Seal-Kap Corp., which licenses it to Medical Dairy Specialties.)

After pasteurization, this dairy item is home-delivered in fresh, whole, homogenized, cream line, and fat-free styles. Actually, it isn't distinguishable from regular milk in respect to flavor, appearance, or the nutritive value.

Health-wise, here's how these pancreatic enzymes change the milk's chemical structure:

1. They lower curd tension, forming a softer curd that is much easier to digest.

2. They hydrolyze milk protein molecules into amino acids that are more readily assimilated by the human body.

3. They carry over, through pasteurization, to give this special milk an enzyme potency equivalent to that of breast milk (4 to 5 times more than raw cow's milk). This enzyme "booster" enables infants to overcome digestive difficulties. And since it cuts down on the amount of work the stomach must do, this product is also used by people with ulcers, by convalescents, and by the growing geriatric group.

Low-Sodium Milk

Just introduced at Brook Hill Farms is a low-sodium milk, for dietary needs, that tastes like regular milk.

This is a Grade A milk that has been treated by an ion-exchange process (patents owned and licensed by Low Sodium Milk Products Co., Venice, Calif.) to reduce sodium content 90% (from 50 to 5 mg. per 100g. of milk).

However, thiamin and riboflavin are also reduced 50% during this process.

Before this milk is run in the ion exchange equipment, a regeneration solution is passed through the resin to replace the sodium. A rinse follows. And after the milk is "de-ionized," it is homogenized, vitamin D enriched, and finally pasteurized, cooled, and bottled.

Goat Milk

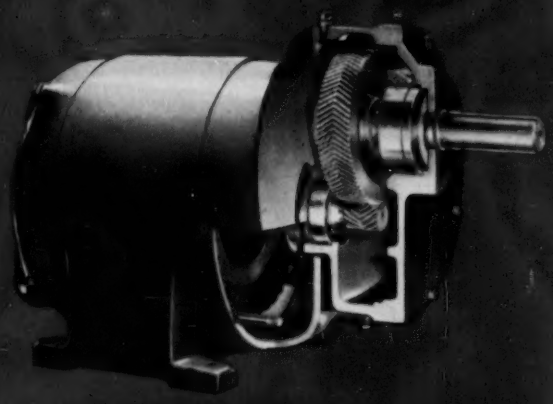
A Grade A goat milk is bottled in pints and quarts for consumption by people who are allergic to the proteins in cow's milk.

To supply this market, the company maintains a 500-goat farm, where latest sanitary dairying techniques are employed.

The milk—a standardized blend from five breeds of goats—is pasteurized 30 min. at 144 F.

Other products produced by Brook Hill Farms include: Certified and homogenized regular milks; soft curd and soft-curd, mineral-modified milks; and yogurt, cultured buttermilk, and soured cream.

End *(Resume reading on page 60)*



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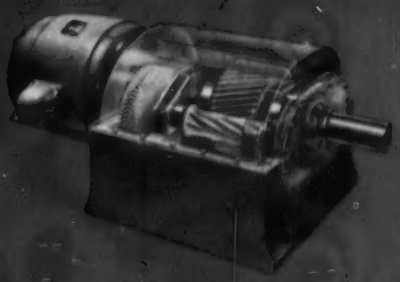
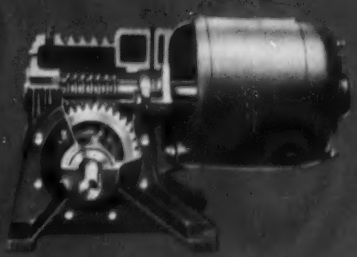


DOUBLE REDUCTION
Parallel Shaft Type



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available in a full line of powders, pastes and liquids to add the mouth-watering richness of braised beef . . . at surprising economy

Your One Source For Both These Taste Builders

Proved Again: the unmatched ability of Huron MSG to awaken sleeping flavors. Fresh pork sausage packed by Chicago's Scott Petersen Company was taste-tested by 81 homemakers, lunching as a panel for the Home Arts Guild of Chicago. Each panel member was served a plate of sausages, half with Huron MSG added, the others untreated controls.

Results: better than a 2 to 1 vote for the MSG flavor-heightened sample. And preference for the sample with MSG jumped to a **rousing 85%** among the testers who serve pork sausage twice a week or more! Scott Petersen now uses Huron MSG, and is **successfully merchandising** this fact as an in-store sales-maker.

Huron MSG, "The Taste-Maker", does the same dependable job whether the pack is fresh, frozen or canned. Meat, poultry, seafoods, vegetables, packaged dinners . . . MSG intensifies your flavors to boost your sales. Call or write Huron today for Mono-Sodium Glutamate, 99+% Pure. And inquire about Huron's experienced, responsible technical service . . . it helps you make the very most of this wise decision.

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Questions & Answers

THIS MONTH'S PROBLEM

Testing Glass Pipelines

Question—We are considering installing a glass pipeline for one of our products to gain practical experience with this type of construction. Plans are to put it near a number of stainless-steel pipelines of take-down construction, so that we can get a good comparison.

Some of our people are rather skeptical about the use of glass. However, we understand that it is quite strong, and would give good service if properly installed. Can you offer any installation suggestions.

MAY PROBLEM

Continuous Meat Process

Question—How can we continuously process table-ready items such as liver sausage, deviled hams, and similar meat spreads?

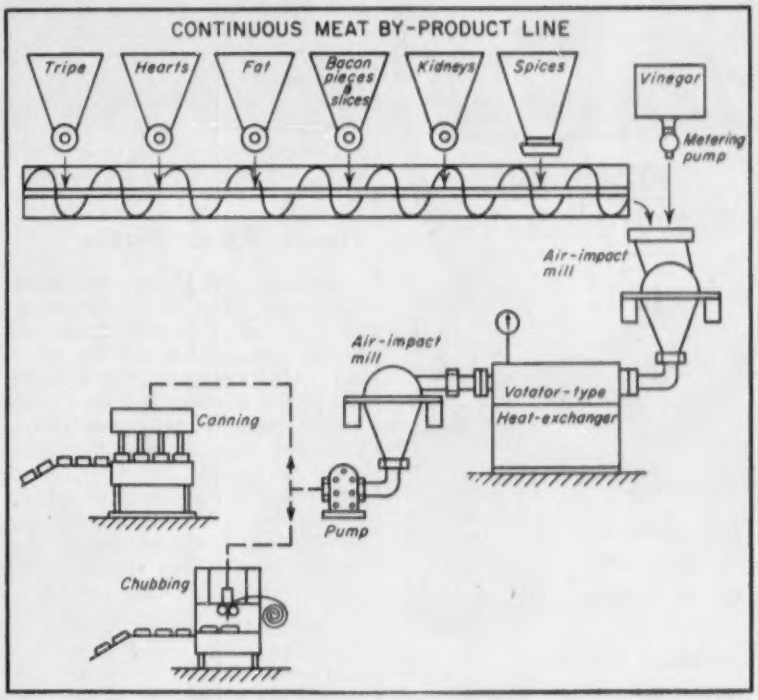
Answer—By using the "impact-in-air" comminution principle, these items can be produced in highly efficient equipment. And they can be made with very fine texture and smooth spreadability.

Formulating potted meats this way, one processor uses frozen meat by-products, since he performs no slaughtering.

As shown in the diagram, tripe, hearts, and fat are first pre-broken, using a conventional meat grinder with a 1-in. orifice plate. They drop into a conventional ribbon-type mixer to which bacon slices, sliced kidney, vinegar, and spices are added. Mixture is then directly discharged into another meat grinder with a ¼-in. orifice plate—the smallest permitting continuous processing without collecting sinews and fibers behind it.

A thermal screw then heats product to about 70F. to make it pumpable. It is next processed through a Votator-type heat exchanger, which raises the temperature to approximately 160F. The comminutor is used as the last stage. Taking the discharge of the heat-exchanger, it produces a fine pureed paste that goes directly to a can filler.

A variation of this process employs automatic metering for individual ingredients, feeding them through a comminutor for uniform pre-sizing. This unit replaces meat grinders, ribbon-type blenders, and thermal screws. A second comminutor then finishes the item.



How table-ready meats are processed (May Problem, left).

A much firmer product results as all free liquids are thoroughly dispersed throughout the fibers. For items such as liver sausage, the above procedure is followed and the product is continuously packaged on chubbing machines.

In the poultry field, giblets such as hearts, kidneys, and gizzards have been processed in this way. With appropriate fillers and extenders, they make highly nutritious and tasty spreads.—George M. Kovac, *The Cog Corp., Chicago.*

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem" Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Soggy Pie Crusts

Question—We've had such fine consumer acceptance of baked pies sold over our counter that we attempted to distribute them through retail outlets in our city and surrounding suburbs. But we ran into trouble. The crusts became soggy, despite the fact that no changes were made in formulation, processing, or handling methods. We might add that only pure lard is used in making our pie crusts. Have you suggestions?

Answer—But you did make a change in your handling method—trucking them miles from your bakery and then holding them for hours in retail stores. To do this, you must bake a pie with a firmer crust that withstands soakage of the filling.

We suggest that you contact your supplier for a firmer lard—one with a higher melting point. Common practice is to add a stiffening agent in the form of 6-10% high-melting-point flakes to the lard. Amount of flakes is influenced by hardness sought and melting point of the lard.

There is also another high-melting-

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point lard. It is prepared by partially hydrogenating the lard and adding a small amount of flakes.

Too, you might consider trying open-kettle rendered lard. It differs from regular refined lard, since it is generally made from leaf fats or a combination of leaf and back fats to give a higher, more uniform melting point.

However, high melting point shortenings are also used by pie makers.

Frozen 'Burger Patties

Question—With the exception of hamburger patties, we have been successfully selling a rather complete line of packaged frozen meats for retail and institutional trades during the past five years. But our patties haven't taken on, since most of our customers complain that they cook our dry and tough.

We've tried many methods—different mixes, grinds, and three types of patty-forming machines—but without success. How can we up the quality of our frozen hamburger patties?

Answer—It is rather difficult to determine exactly where you are running into trouble. However, we'd suggest you repeat some of your tests to determine the effect of grind size and percentage of fat on final quality.

First, run the meat trimmings through a grinder with plates in the ¼ to ⅜-in. range. Grind size influences the lean-looking appearance of the patties. The finer the grind, the fatter the patties will look.

It's also possible that you are not using enough fat. So, try making some patties with 30-35% fat.

Another approach is to make patties without a forming machine. This method is being used successfully by some processors:

Place ground meat in sausage-stuffing machine, then force about 10 lb. into suitable artificial casing or plastic tubing (polyethylene, Pliofilm, cellophane, vinyl, Saran). Load stuffed hamburger meat into portable rack, transfer into freezer, and freeze meat at about 0 to −5 F.

The stuffed "log" of frozen ground meat is then formed by tempering the meat to an internal temperature of 28 F. Roll of meat is now fed to a modified bacon-slicing machine, where it is cut to desired thickness. Slices are assembled for packing into cartons, which are then overwrapped in protective film and transferred to freezer before shipment.

We did not discuss the selection of packaging materials for your frozen patties, since apparently you did not run into trouble with other packaged frozen meats.

Q.—You can help me by supplying a sugar-boiling table, where temperatures correspond to cooking to soft and hard balls and cracks.

A.—Syrup (small thread), 218-220 F.; large thread, 228-230 F.; blow, 230-240 F.; soft ball, 242-244 F.; hard ball, 250-255 F.; small crack, 260 F.; hard crack, 218-315 F.; and carmel, 320-360 F.

Single or Multi-Story?

Question—We are giving thought to building a new plant for the processing and packaging of several specialty foods. Our present plant is multi-story, and some of our management team favor this type of construction for the new building. Others are advocating a single-story structure. What are the pros and cons?

Answer—There are several points in favor of multi-story construction. It requires less land for a given size plant—a factor if you are considering an urban location or trying to fit another building on an existing plot. On a cost-per-cubic-foot basis, it should be less expensive to construct and heat this type of building. And considering the expected life of a new building, heating cost might be quite a factor in a cold climate.

Another advantage of multi-story construction is that it permits taking maximum advantage of gravity flow in processing. This can be important where products are difficult to convey without excessive cost or damage to physical properties.

On the other hand, many plants are being built on the single-story plan because:

1. Materials handling is simplified by exclusion of elevators, which avoids a potential bottleneck at the outset. Also eliminated are the cost of elevators, the space they occupy, and their maintenance. Then, too, heavier-duty fork trucks can be used without regard to load limits of elevators.

2. Future expansion of the building is more readily accomplished. It is common practice to build a temporary wall, which later can be knocked out when an addition is constructed. If a multi-story building is planned for future enlargement, there must be access between old and new structures at all floors and to elevators unless additional ones are to be provided.

If expansion takes the form of additional stories on the original building, all foundations and columns must

How to save time and money in package imprinting

Tickometer

With the Tickometer, you can count and imprint on product labels — sizes, weights, colors, dates, codes, etc. — *as needed* for current production. You cut printing costs, reduce label inventories, prevent waste of unusable pre-printed labels.

The Tickometer imprints up to 1,000 pieces a *minute* — feeds, counts and stacks automatically. It imprints anywhere on an area 2¼ by ⅞ inches, handles a wide variety of paper and card stocks, in sizes from 1 by 2 inches to 8½ by 15 inches. And it can be easily operated by anybody without special training.

Thousands of companies have made major savings in marking, coding, imprinting various paper forms and items—including coupons, checks, transfers, sales slips, tags, tickets, etc. And it counts so accurately that banks use it to count currency!

Package Imprinter

With the amazing new "4800", you can also imprint cartons and other containers *as they are needed*. It cuts costs, reduces inventories, eliminates wasteful preprinting.

Sizes, weights, colors, dates, trademarks, too, can be imprinted on folding cartons, bags, envelopes — even dealer literature — at speeds up to 7,500 pieces an hour.

Easily operated by anyone, the Imprinter can be adjusted without tools. Rubber mats or type from 6 pt. up are used, and the impression surface is 4 by 18 inches. It takes material in sizes from 2½ by 2½ inches up to 18 by 18 inches — in most any finish of paper or board; in thicknesses from .010 to ¾ inches. It also prints on most plastics, cellophane, foils, etc. Liquid ink requires no mixing, dries instantly. And the PB Stacker stacks automatically, ready for distribution. Service from 272 points, coast to coast.

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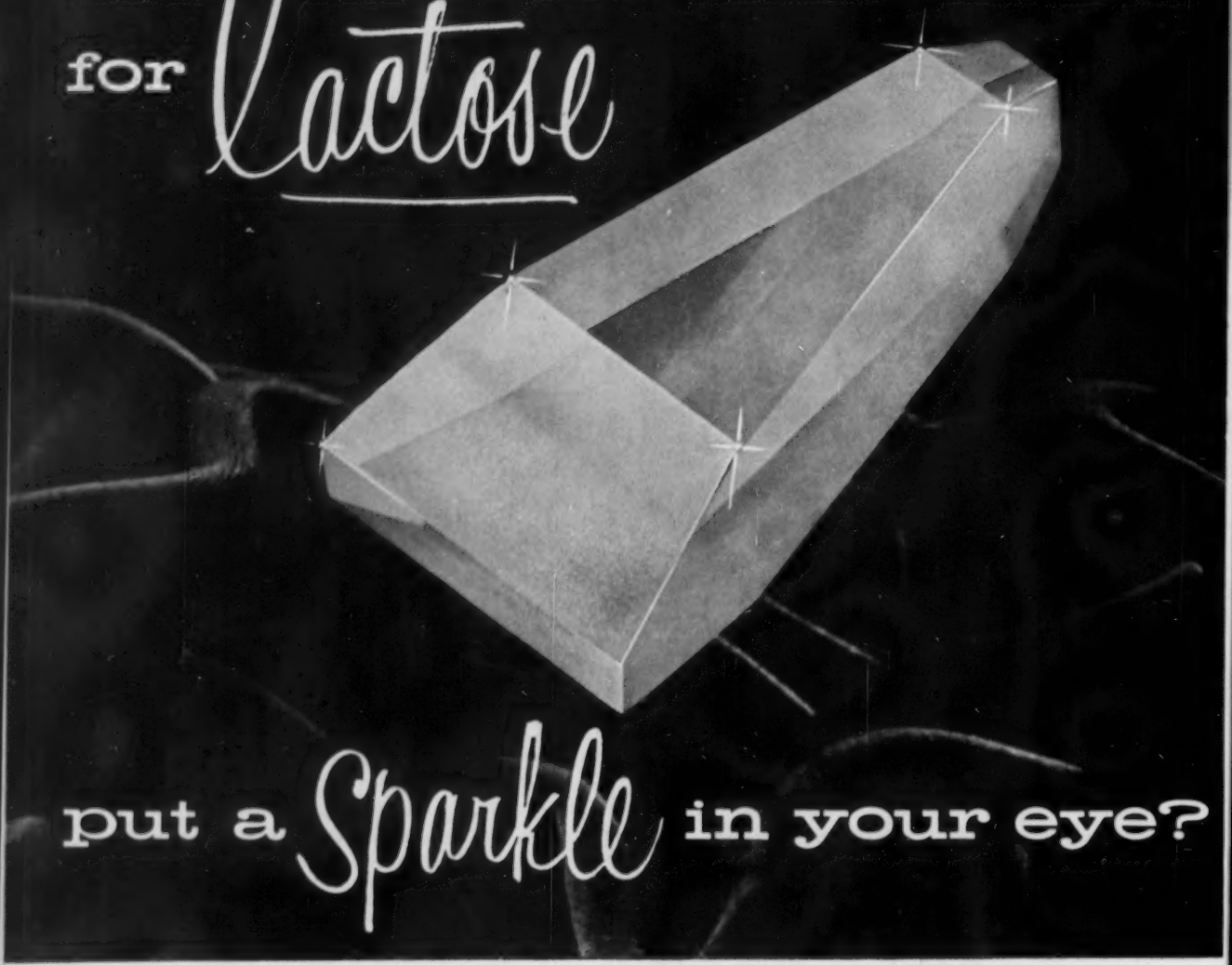

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be strong enough to carry the extra load. This makes them more costly than necessary initially.

3. A single-story plant can be laid out to provide receiving at one end. Then, material flows through storage, production lines, and warehousing, and out the other end. Such straight-line layouts greatly facilitate supervision, with everything on one floor.

4. Further, labor efficiency is usually better on a single floor than when workers are needed on each floor and must keep in communication by speaking tubes or intercoms.

5. It is more practical to build a heavy load-supporting floor when the entire building is on ground level. This, in turn, permits high stacking to conserve floor space. Since columns support only a roof, they can be smaller and farther apart, with less waste of floor space.

These comments must necessarily be general. Final decision will depend on your own products and plant location.

You might find that a compromise would be best, with a small portion of the building multi-story to provide out-of-the-way space for office, laboratory, locker rooms, shops, etc. And the main production building one story to gain the suggested operating and cost benefits.

Q.—How do you make a fig jam to be used for fig bars?

A.—Boil to 222 F., 40 lb. sugar, 13 lb. water, and 4 lb. glucose. Then add 43 lb. ground figs, and continue to boil to 222 F.

Preparing Oxtail Soup

Question—What instructions can you offer for producing canned condensed oxtail soup?

Answer—Cut 250 lb. of oxtails into small pieces and brown with 2½ lb. of butter or margarine in jacketed kettle. Bring to a boil and simmer for 1½ hr., the browned meat, 20 gal. of water, 12½ lb. of finely chopped onions, 12½ lb. of chopped turnips, 12½ lb. of chopped carrots, ½ lb. of beef extract, ¼ lb. of cloves, and ⅛ lb. of bay leaves.

Remove meat and vegetables from kettle, and thicken batch by adding, with agitation, 2½ lb. of corn starch blended with a little cold water. Now introduce (with heat off) 2 lb. of salt, ¼ lb. of ground black pepper, 3 qt. of sherry wine, and ¾ qt. of caramel.

Finally fill condensed soup, oxtail pieces, and vegetables into cans. Seal and heat process.

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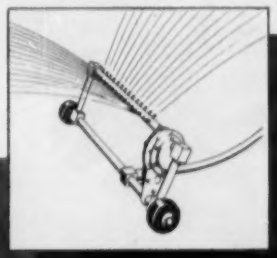
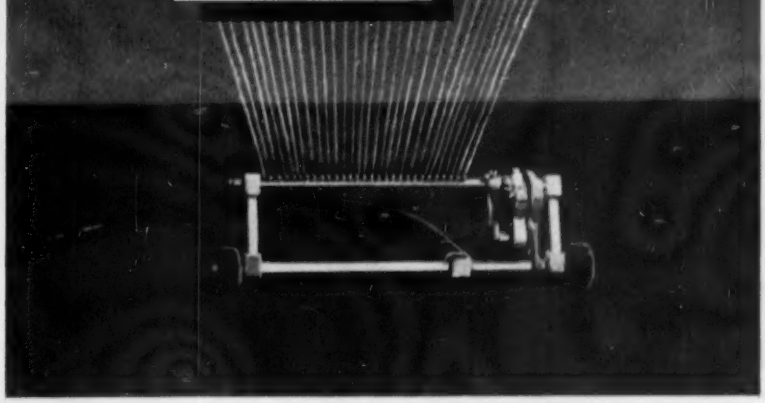
With this brand-new Oakite Fan-Spray Unit, mechanized sanitation of holding tanks, vats and tank trucks takes a great step forward. You get portable, high pressure fountain action—jet-streams flushing every square inch of tanks surface as the Unit oscillates. Simply place the Oakite Fan-Spray Unit in position, then use it for pre-rinse, for sanitizing with Oakite solution, for after-rinse. That's all. You're finished . . . fast and easy! Ask your local Oakite Technical Service Representative for a demonstration, or write to Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.



End view of Fan-Spray Unit showing double jet-stream cleaning action.



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Mocha Chiffon Pie

Question—Do you have a formula for making a mocha chiffon pie?

Answer—Mix 3 lb. of sugar, 2 oz. of agar, ¾ oz. of soluble coffee concentrate, and ¾ oz. of salt. Bring dry ingredients to boil with 4½ lb. of water and ¾ lb. of bitter chocolate bits.

Now add 10 oz. of corn starch and 1½ lb. of water. Cook until batch thickens and immediately fold hot mix into stiff meringue.

The meringue is prepared by beating until stiff 2 lb. of egg whites, 1½ lb. of sugar, and ¼ oz. of cream of tartar.

Immediately fill extra deep into 8-in. pre-baked pastry shells to 18-oz. filling weight.—*Formula by G. Washington Div., American Home Foods, Inc., N. Y. C.*

Kettle the Bottleneck

Question—One of our products is cooked in a battery of coil-type kettles, using stainless steel coils and high-pressure steam. With recent improvements in our filling lines, we find that this cooking is delaying our operation. However, we do not have space for adding kettles. Can you suggest how we might speed up our cooking in these kettles?

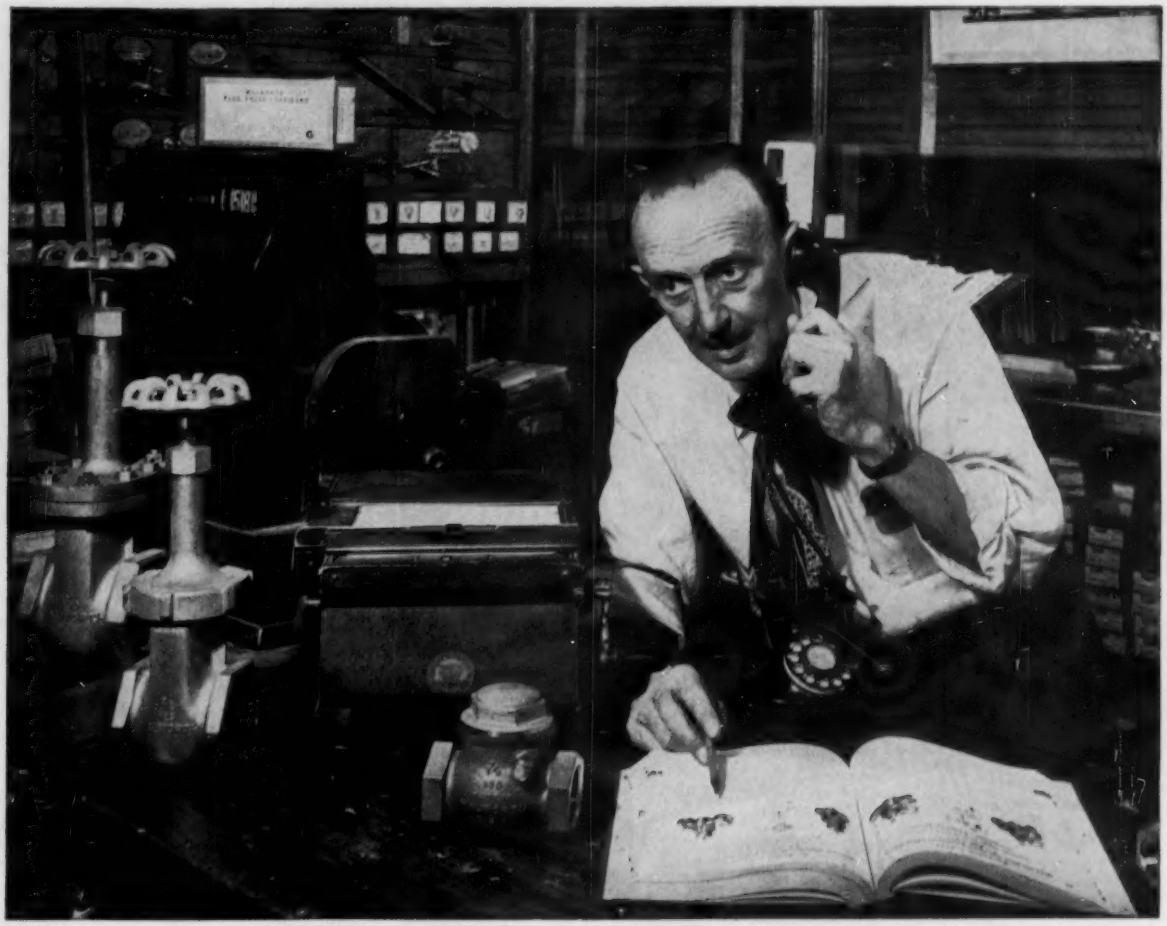
Answer—Check to see that your kettles are receiving the full amount of steam of proper quality and at the desired pressure. After determining the safe pressure for coils and product, put a pressure gage on your steam inlet to be certain that you are taking advantage of the maximum permissible steam pressure. Next, provide a trap just ahead of the kettles for any condensate in the steam-supply line, so that entering steam is as dry as possible.

Look into the trapping of the coils themselves to make sure that you are using the correct size and type, and that coils are individually trapped, not manifolded to a common trap.

If these simple measures are not effective, you may wish to install a high-pressure condensate return system, which generally will speed up cooking and may save a little on fuel as well.

If product characteristics permit, you might also consider changing the cooking coils from stainless steel to nickel, because of the greater heat conductivity of the latter. Of course, this represents quite an expense, and there is a present shortage of this strategic material. Still, nickel coils might increase your cooking sufficiently to keep pace with your improved filling-line performance.

We suggest making this substitu-



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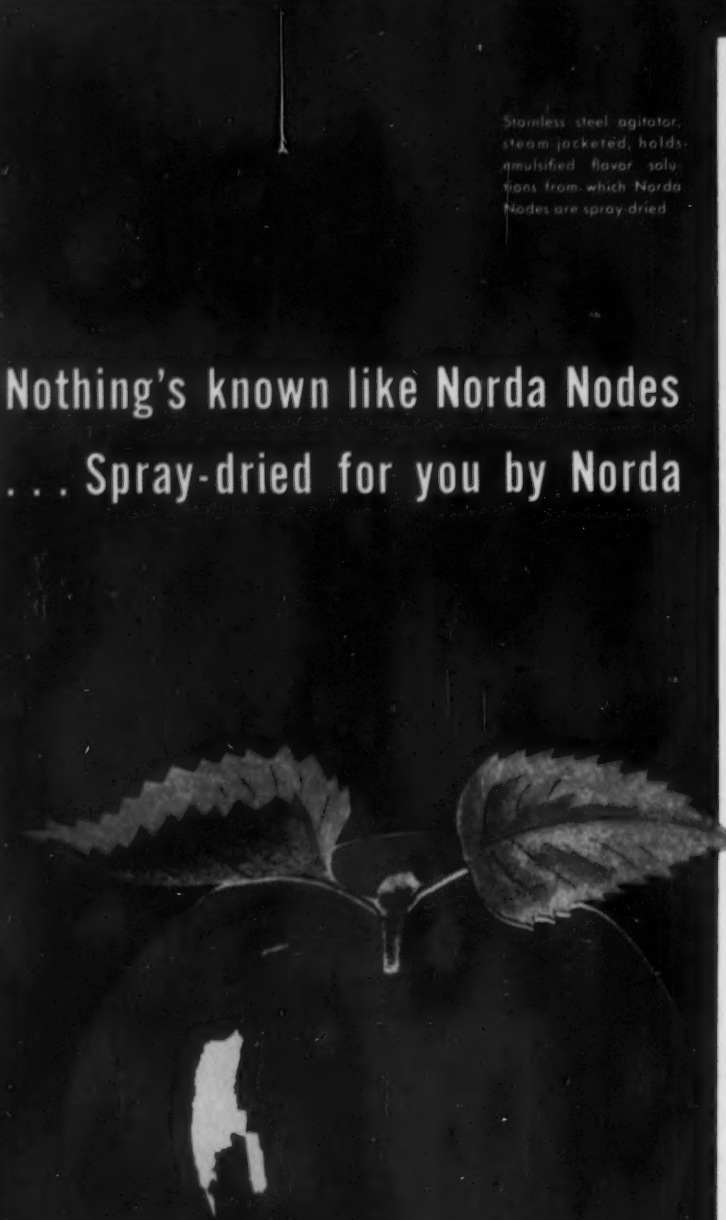

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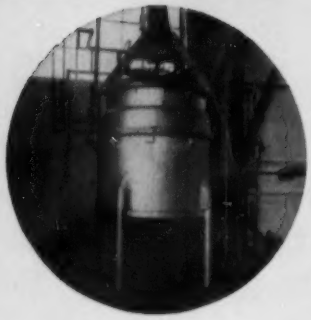

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Norda developed Norda Nodes because you have good use for spray-dried flavors of very great excellence.

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Norda Nodes are true-fruit flavors, truly rich and real – tiny, colloid-coated flavor "grains" that keep the flavors in your products fresh, unchanging, and stable till your customers buy and use them. Norda Nodes lick the problem of "shelf life."

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tion on one kettle and keeping records of the cooking time per batch compared to the regular coils. If it proves itself, you can then set up a program to change the others on a schedule so as to spread the cost over a suitable period of time. Of your records might show a sufficient increase in output to justify the complete changeover at once on an economic basis.

—*End*—

Israeli Milk Plant

—*Continued from page 75*

a steam chamber, with a temperature of 247F. First and third sections are partially filled with water. This provides a water lock and maintains pressure in the central steam section of the tower.

How Bottles Are Processed

Bottles enter the sterilizing tower at 125F., travel up the first half of the first section, then plunge down through the hot water in the second half.

When the containers reach the central steam chamber, milk is at 194 deg.

In the pressurized chamber, milk is heated to 237F., then passes to the final section. Here, bottles are slowly cooled, first by passing through the water-seal bath, then by cold water sprays during the final descent.

Product leaves the sterilizer at 160 deg., and is crated and air-cooled before shipment.

A new sterilizing tower, now on order, will have twice the capacity of the present unit. An added feature will be a fourth tower section to permit cooling bottles to 130F—for the present method of air-cooling takes too long, even though the company speeds the process by moving finished product into cold storage rooms as soon as possible.

Nutrition Factors Analyzed

Certain changes in the chemical and physical nature of the milk occur during complete sterilization. These alter, to a slight extent, vitamin content of the product, as well as color and flavor.

Lactose, which is heat sensitive, is partly oxidized and forms organic acids. It is likewise caramelized to some degree.

A slight protein breakdown frees some amino acids, and gives this product a high-titratable acidity.

Sterilized milk has greater viscosity

W & T CHLORINATION . . .

complete algae control for 25% of the cost of best previous treatment

The Geo. Wiedemann Brewing Co., of Newport, Kentucky had an algae problem on the water-side surfaces of their pasteurizers that increased operational costs, cut pasteurization efficiency, caused corrosive pitting of the units, and created very objectionable odors.

Five years ago, after trying other treatments, a Wallace & Tiernan chlorinator and proportioning solution panel were installed. The chlorination treatment has been completely successful in eliminating the problem at about one-fourth the cost of the best treatment tried previously.

A Wallace & Tiernan chlorination system can correct problems caused by algae growths in your process. Write for our free bulletin 2136-C that describes the Geo. Wiedemann Brewing Co. case history, and tell us of your specific problem.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

1-56

W&T MERCHEN SCALE FEEDERS & METERS

for Automatic Batch Control
Continuous Blending
Materials Accounting

Control the feeding of ingredients by weight to an accuracy of 1%.
Capacities range from 3 to 3000 lbs. per min.

WRITE FOR YOUR COPY OF OUR BULLETIN:
"The Best Weigh is the Merchen Way."

WALLACE & TIERNAN INCORPORATED

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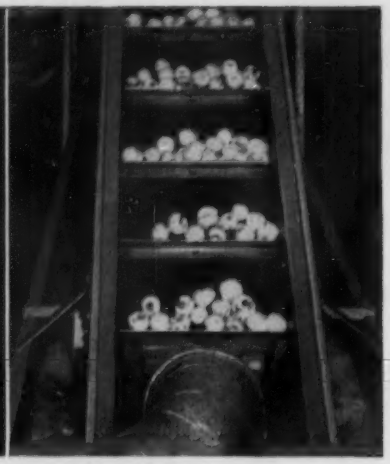
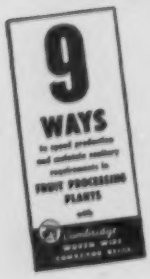
UNIFORM SANITARY CANNING



WITH *Cambridge* WIRE MESH CONVEYOR BELTS



Regardless of what fruit or vegetable you're processing and canning, you'll get a higher quality, more uniform product by carrying out most of your operations on sanitary, damage-reducing wire mesh belts. While continuously moving raw or cooked stock, whole or sliced, through your plant, Cambridge Wire Mesh Conveyor Belts eliminate most manual handling in peeling, coring, washing, cooking, canning and shipping. Open mesh permits forced washing, rapid drainage and free circulation of steam and air. Write for detailed discussion of how Cambridge belts speed production and maintain sanitary requirements.

No matter what food or process...

. . . meat, poultry, candy, fruit or produce . . . canning, freezing, baking . . . Cambridge Wire Mesh Conveyor Belts can reduce your operating costs and increase product quality by continuous uniform processing with reduced manual handling. Lifelong rust protection, quick drainage of process solutions, lack of odor and freedom from contamination are only a few advantages. All-metal belt is impervious to damage from heat and cold. There are no sharp edges because Cambridge belts are woven from round wire.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, and from any metal or alloy. Special raised edges or cross-mounted flights to hold your product during inclined movement are available.

Call in your Cambridge FIELD ENGINEER to discuss how you can cut food processing costs by continuous operation. Look under "BELTING, Mechanical" in your classified phone book. OR, write for FREE 130-PAGE REFERENCE MANUAL illustrating and describing wire mesh conveyor belts. Gives mesh specifications, design information and metallurgical data. Ask for Special Industry Folder on your operation.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department Q,
Cambridge 7,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

than pasteurized. Changes in colloidal condition of the calcium casein complex, and flocculation of albumin are mainly responsible for this condition.

Nutritionists disagree on the comparative nutritional values of sterilized and pasteurized milks. Yet the former is gaining wide acceptance. In fact, UNICEF, through its milk conservation program, has introduced the item in several other countries, such as Iraq, Greece, and India. And European countries, notably England and France, are adopting the product—despite competition from pasteurized milk.

Naturally, the changes in vitamin, protein, and mineral content in sterilized milk depend largely on the process used. But some general facts are known. Example:

There is little loss of vitamin D and carotene during sterilization. But, vitamin A is reduced by about 12%. Likewise, vitamin B_1 is cut between 20 and 50%. Vitamin C is easily oxidized, thus is almost completely destroyed in sterilized milk.

However, vitamins A, B, and C are also partially destroyed in pasteurized milk. And it is reported that overall differences between the two products are slight.

Effect of Light on Milk

Storage of sterilized milk in lighted rooms gives further reduction of photo-sensitive vitamin content. It is said that vitamin A drops as much as 40% when the product is stored for two months under these conditions. Also, vitamin B_2 is reduced 60% in three months. And any remaining vitamin C is quickly destroyed by light.

There appears to be no significant difference between sterilized and pasteurized milks as far as availability of proteins, butterfat, lactose, and minerals are concerned.

Occasionally, bitterness in the product has cropped up at Tenne-Noga. This phenomenon has been reported by European dairies, but as yet there seems to be no clear explanation of the cause. The off-flavor is random, and frequently affects only one or two bottles in a batch.

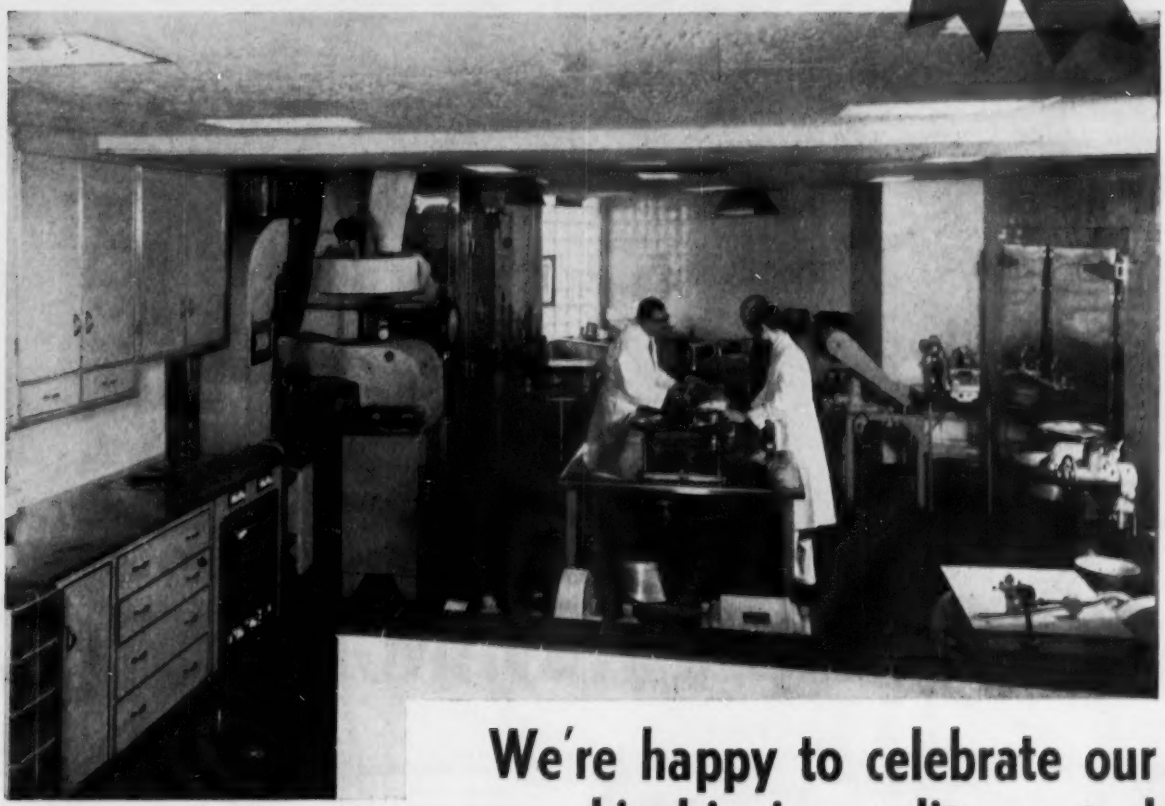
Preliminary investigation of the problem in Israel, and consultations with European dairy experts, have led to six hypotheses: (1) that the bitter taste may stem from heat-resistent spore formers, (2) from chemical action with the caps, (3) poor capping, (4) dissolved metal in the milk from faulty milk cans, (5) protein breakdown, or (6) the present long cooling period.

End (Resume reading on page 76)

Congratulations to the men of FMIS

FEDERAL MEAT INSPECTION SERVICE 50th ANNIVERSARY

50 U.S. INSP'D P'S'D



20th Anniversary of our Research Kitchen

Established and directed by Stephen Komarik, eminent as creative sausage-maker and food processor, shown at left above.

For all pork curing — hams, bacon, sausage, picnics — use PRAGUE POWDER®, made or for use under U.S. Patent Numbers 2054623, 2054624, 2054625, 2054626.

We're happy to celebrate our kinship in quality control

The Kitchen is a vital link in Griffith's *research*—in product development—in practical testing of materials and methods. *The Kitchen* serves to establish quality standards and directions for use of Griffith products in Federally Inspected Meat Plants.

THE Griffith LABORATORIES, INC.

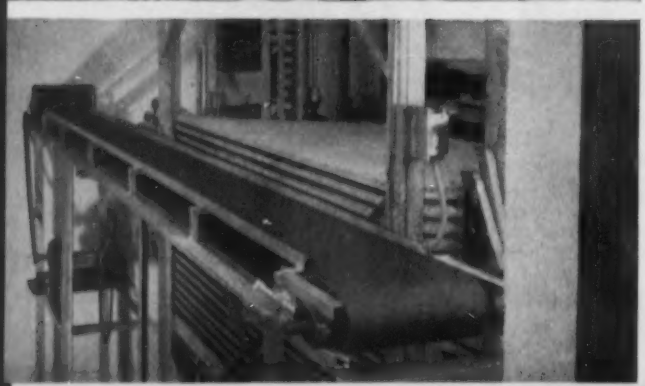
In Canada—The Griffith Laboratories, Ltd.

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St.

LOS ANGELES 58, 4900 Gifford Ave. • TORONTO 2, 115 George St.

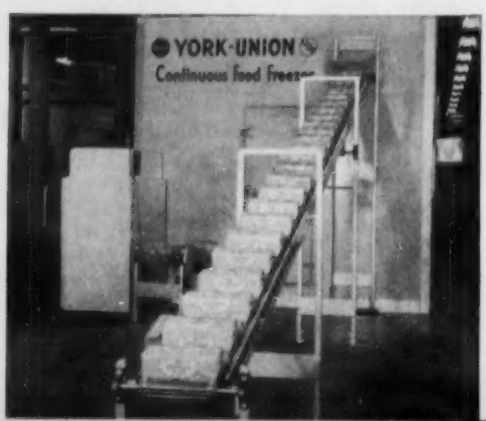
For more data, circle this page number on card at front →

THE BIG ADVANCE IN FOOD:



YORK CONTINUOUS PACKAGE FREEZER (left) automatically loads and unloads rectangular packages in volume. A single operator controls the entire freezing process. Automatic loader pushes each row of packages onto a freezing plate, where product begins freezing instantly on contact (upper left). Both top and bottom surfaces of packages are in intimate contact with plate and freezing is uninterrupted by loading of additional product. When filled, machine ejects row of frozen product for each new row of product loaded (lower left).

YORK-UNION CONTINUOUS FOOD FREEZER (below) handles varied products at high speeds, automatically. Amazingly versatile, this York-Union Continuous Food Freezer can freeze thousands of food packages an hour. A typical unit 60′ long, 14′ wide and 11′ high could freeze each of these quantities in an hour: 3720 half gallons of ice cream; 3560 loaves of bread; 2390 whole 2¼ pound chickens. A uniform temperature of −30° F. or lower can be maintained.



CONTINUOUS FREEZING BY YORK

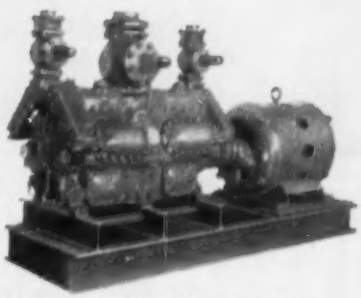
Two new versatile York freezing systems are completely automatic, make possible important economies in frozen food handling.

Automatic, high speed *continuous* food freezers are now a reality, thanks to York leadership in refrigerating equipment.

This is exciting news, not only for food processors, but for the housewife who buys food for her family. It can mean frozen foods in greater variety, at greater savings. Formerly, fresh foods had to be stacked on trucks by hand, pushed by hand into the freezer, and unloaded by hand. But York's new automated procedures will speed and simplify handling.

York designed one of these new freezers especially for large, bulky foods or odd-shaped packages. The other is for small, rectangular packages of uniform size, and can adapt itself to packages of different sizes as required by various runs.

For more information on these new freezers call your nearest York district office. The telephone number is listed in your Classified Directory under "Refrigeration Equipment".



HEART of any York freezing system is a York compressor. Above is a 3¾"x3" VW, one of many different types of York compressors.

York refrigeration air conditioning

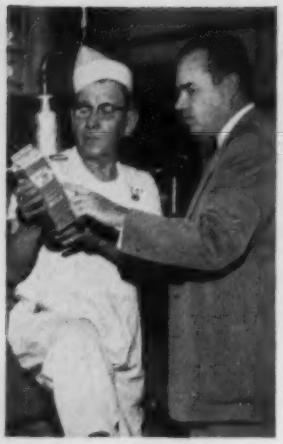
the quality name in freezing

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

He showed this dairy the way to 6 carton improvements with Super STANISEAL Wax

Brighter carton appearance, better processing of wax among benefits Heart of Iowa Dairy received by converting to Super STANISEAL

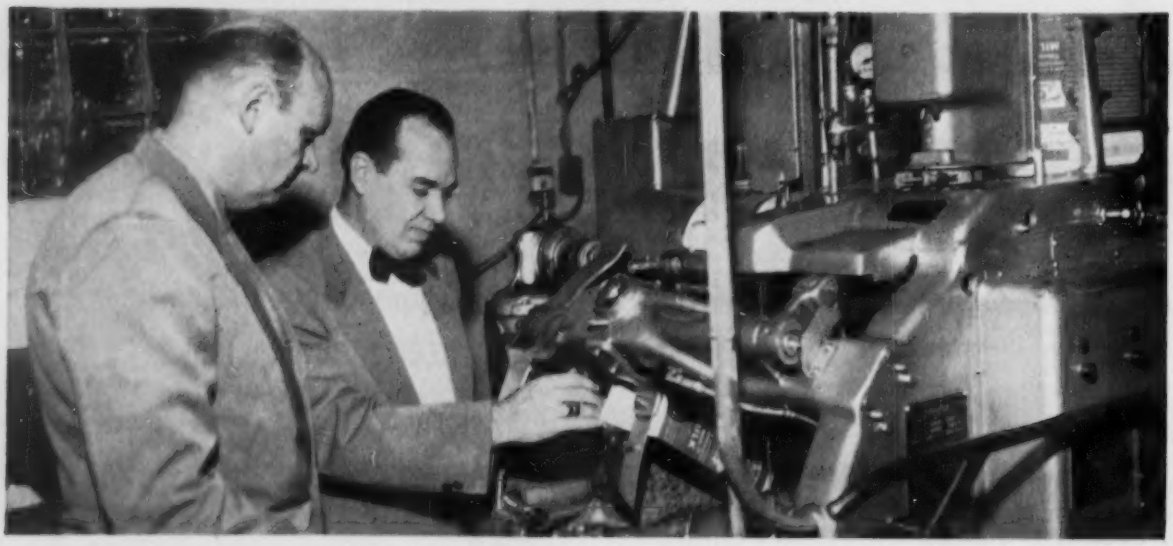


Operator Joe Lang (left) and Standard Oil man Jesse Nelson inspect carton coated with Super STANISEAL Wax. As expected, they find clear, bright finish. Jesse Nelson has been providing technical service to customers with wax problems for more than three years. With a degree in engineering from the University of Iowa and a graduate of the Standard Oil Sales Engineering School, Jesse is well qualified for such work. Customers find this experience and training pay off for them.

When Standard Oil man Jesse Nelson called on Heart of Iowa Dairy, he found the management dissatisfied with the milk cartons being produced. Carton colors lacked brightness and clarity. Leakers due to poor wax coverage were another problem. Operators had trouble keeping enough wax melted without shutting down the machine. Three brands of wax had already been tried, all gave the foregoing disappointing results. Jesse Nelson proposed a change to Super STANISEAL Wax. Nelson and machine operators, carefully checked temperature of the wax and of the cooler, also the amount of wax used per carton. With Super STANISEAL Wax, here are the results obtained:

1. Consumption of wax reduced 14%.
2. Wax residue in the preheater eliminated.
3. Wax melting problems checked.
4. Carton finish smoother and brighter.
5. Leakers and wax flakes in cartons eliminated.
6. Customer's carton complaints ended.

Perhaps your Standard Oil man can show you how to obtain similar results by switching to Super STANISEAL Wax. Call him. There is one nearby in any of the 15 Midwest and Rocky Mountain states. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Jesse Nelson (right) discusses operation as Heart of Iowa president George F. Day observes. Dairy switched to Super STANISEAL Wax and got 6 important carton improvements.

***Quick facts about* Super STANISEAL Wax**

- Is a balanced blend of highest quality wax and polyethylene.
- Virtually eliminates wax flaking in milk.
- Has greater wax strength. Result: fewer leakers, fewer rejects.
- Cuts wax scuff-off on machine.
- Is especially formulated to eliminate wax bubbling.
- Produces a smooth, even coating that gives sharpness to colors and enhances appearance of finished carton.

STANDARD

STANDARD OIL COMPANY
(Indiana)

Dehumidifying Setup

—Continued from page 81

Each dipping-drying machine incorporates three stages with a total capacity of 5,000 lb. per 8-hr. shift. Two such units are arranged side by side for highest production efficiency, and together they occupy about 20,000 cu. ft. of space.

Essentially, each unit is a large metal box rising about two stories above the floor. At the feed end, operators load magazines with freshly-baked biscuits, using a different magazine for each shape.

The biscuits drop automatically onto plates. These move them forward, then upward so that they meet and are impaled upon hanging mechanical fingers arranged on traveling horizontal bars. The latter carry the products into the dipper-dryer, with appropriate traveling distance between successive dips to allow time for setting of each icing.

Humidity Control Is Key

Exact control of the atmosphere inside the chambers is essential to successful operation, since biscuits and icings give off moisture and heat which must be dissipated. Each icing must be set before the article arrives at the next dipping point. And finally, the biscuits must be ready for the manual packaging by the time they get to the end of the line.

To meet this problem, N. B. C. built into the machines a humidity-conditioning system that depends on a controllable chemical process to remove moisture from the air continuously and automatically.

Three units (Kathabars, Surface Combustion Corp., Toledo, Ohio) were installed with each machine to maintain the 35% relative humidity at the 85F. required for proper setting and cooling.

These humidifiers employ a lithium-chloride-base solution (trade-named Kathene) to absorb moisture from the air. At a fixed concentration, it absorbs moisture in direct relation to its temperature—the cooler the solution, the more moisture it can absorb.

Then by varying the temperature with standard cooling equipment (refrigeration compressors in this installation), rate of moisture absorption can be controlled to a fine degree.

Absorber Operation

Each unit consists of an air-washer section and a regenerator section. Air to be treated enters the washer section and is exposed to a flood of solution, then is delivered to after-cooling or after-heating equipment, which maintains the required temperature.

Regeneration of solution is accomplished simply and automatically, without interrupting moisture absorption in the washer. A portion of the liquid is pumped from a common sump over steam coils in regenerator section. When the level in the sump rises sufficiently, through addition of moisture from the air, a float switch actuates a valve to admit 25-psig. steam to the regenerator coils. Heat drives moisture out of the solution and into a scavenger air stream vented outside the building.

When enough moisture is removed, the level in the sump drops and the valve closes to stop the steam supply. Regeneration of only 10 to 15% of solution serves to recondition the remainder for efficient moisture absorption.

Operation and maintenance are simple and inexpensive. No licensed personnel is needed, since maintenance consists chiefly of checking the solution supply from time to time. The unit has few moving parts—simply two motors, a pump, and scavenger air fan.

Two additional features of this equipment are of particular importance in food processing.

First, there is no carryover of solution, as vapor or fumes, into the conditioned air stream. Second, the solution has antiseptic properties that remove 97% of airborne organisms, pathogenic or non-pathogenic, from the treated air.

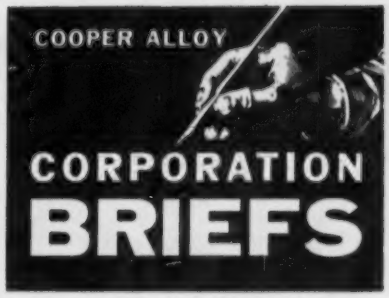
These factors provide an extra guarantee of purity and quality in biscuits and cookies passing through the air in the machine.

In this installation, three units are mounted alongside each dipper-dryer. They are set on catwalks at about second floor level, thus leaving the floor clear for cleaning and for work by operators and inspectors, who must have access to the machine interiors.

The three dipper-dryer stages are furnished controlled air by one Model 500B unit and two 350B units (see diagram). First-stage unit takes 1,500 cfm. of outside air (95F., 118 gr./lb.) and 3,500 cfm. of recirculated air from the dryer (85F., 40 gr./lb.). Thus, it delivers 5,000 cfm. of 68F., 23 gr./lb. air to the dryer continuously.

In the last two stages, which operate in the same manner, units use 1,500 cfm. of outside air (95F., 118 gr./lb.) combined with 2,000 cfm. of air from the dryer (85F., 40 gr./lb.) to deliver 3,500 cfm. of 68F., 24 gr./lb. of controlled air.

End (Resume reading on page 82)



• Edited by GEORGE BLACK

DOUBLE-D REFINER

The Jones Double-D Refiner is said to bring an entirely new concept to the preparation of stock for the paper machine. Key to the design lies in the twin refining area with its double discs. For a more complete story ask for the February issue of Cooper Alloy NEWSCAST.

WHAT'S IN A TRADEMARK

Behind the Cooper Alloy trademark, cast or stamped into our stainless steel fittings, stands more than a quarter century of experience and the most complete production facilities in the industry. When you specify Cooper Alloy fittings you can be sure that every step from design to shipment is under the supervision of specialists. Look for the CA trademark before you buy . . . it is a sign of quality, experience and reliability.

DESIGN FEATURES FEATURED

Design features that have made the Cooper Alloy stainless steel valve the preferred valve for chemical processing are presented in the current issue of NEWSCAST. Diagrams and text combine to make a thorough presentation. Additional copies available on request.

NEW PUMP IN DEMAND

The new line of stainless steel rotary pumps announced by our Vanton Pump Division has taken the field by storm because it is the one (and only) pump of its kind without stuffing boxes or shaft seals. Bulletin VP561 gives the facts. Write for it today.

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Useful New Books & Government Publications

Understanding the Worker

PSYCHOLOGY IN MANAGEMENT BY Mason Haire. *Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1956. 212 pages 6¼ x 9¼ in., cloth. Price:* $4.75.

In this book, specific industrial personnel problems and behavior underlying them are discussed and interpreted from the managerial viewpoint. Detailed and practical information is presented on such subjects as motivation, learning, preception, attitudes, communication, leadership, productivity, training, and organization.

Such important issues as role perception in labor-management relations, psychological factors in wage-payment plans, and psychological forces restraining productivity are covered.

Book is designed to set forth psychological principles and their implications in industrial management. Specific solutions are avoided and attempts are made to consider the general factors.

Author has had wide experience as a consultant. He is professor of psychology and a member of the Institute of Industrial Relations at the University of California.

The Foreman and Safety

SUPERVISOR'S SAFETY MANUAL. *Published by National Safety Council, 425 N. Michigan Ave., Chicago 11. 1956. 334 pages. Price:* $6.50 *(*$3.25 *to Council members).*

Providing the foreman with a comprehensive guide to all phases of industrial safety, this book was written by Council engineers under the guidance of leading safety experts from industry, business, and government.

Offering a basic study of accident presention techniques and human relations know-how, the book may be used as a text for group study or as a handy shelf reference. Illustrated with photographs and sketches, it includes material on first aid, protective equipment, housekeeping, materials, handling, portable power tools, and fire prevention.

Plant Engineering Guide

1956 HEATING, VENTILATING, AIR CONDITIONING GUIDE. *Published by American Society of Heating and Air-Conditioning Engineers, 62 Worth St., New York City 13. 1956. 1696 pages. 6¼ x 9¼ in., cloth. Price:* $12.00.

This 34th edition of a standard reference work contains technical data section, manufacturer's catalog data section, and complete indexes.

It is directed at providing the engineer with a handy and authoritative manual on design and specification of heating, ventilating, and air conditioning systems based on activities of the Society's members.

Illustrated, book offers wealth of working charts and tables.

409 Top Companies

MANUAL OF EXCELLENT MANAGEMENTS (1956). *Published by American Institute of Management, 125 E. 38th St., New York City 16. 1956. 192 pages. 8½x11¼ in., cloth. Price:* $20.

The result of an appraisal of over 4,000 American and Canadian companies, book contains the names of 409 firms cited for performance in 1955. The companies are listed alphabetically, by industry, geographically, and by AIM rating.

Top executives of each company are listed, along with brief statistical data.

Booklets & Reports

REFERENCE GUIDE FOR CONSTRUCTION AND INSPECTION OF WOOD PALLETS. (PB 111998) *Published by Office of Technical Services, U. S. Dept. of Commerce. 99 pages. Price:* $2. Reference work based on Armed Forces experiments.

USE OF CHEMICAL ADDITIVES IN FOOD PROCESSING. *Published by National Academy of Sciences—National Research Council, Washington 25, D.C. 91 pages, paper. Price:* $2. *Index and rundown of 550 chemicals.*

FE REPRINTS AVAILABLE

Difficult-to-find practical information on food plant operations and materials is available in the "roundup" reports and articles listed below. Single-copy reprint prices are given. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

8. Newer Ingredients $1.25

Twenty-page report on the newer ingredients which aid in producing better food products (May, 1952). It includes detailed articles on these subjects: (1) Guide to Optional "Chemical" Additives. (2) Antioxidants Provide New Flavor Controls. (3) Industrial Enzymes Now Speed Natural Processes. (4) Food Emulsifiers Bring New Highs in Uniformity. (5) Seaweed Extractives Find Versatile Uses in Foods.

9. Vacuum Cooling $0.75

Eight-page special report covering the use of efficient vacuum cooling in a wide variety of food processing operations to save costly process time, reduce labor, increase output, and avoid spoilage losses (October, 1952). Preference data for specific types of applications are presented in this engineering study.

10. Packaging Materials $1.00

Sixteen-page report on how to get better production-line performance with packaging materials and containers (March, 1952). It includes these comprehensive articles: (1) Developing Your Package for High Output. (2) How Properties of Materials Affect Packaging Speeds. (3) Nipping Production Slowdowns by Prechecking Supplies. (4) Tips on Ordering Materials for Top Performance. (5) Proper Storage of Your Stock Averts Line Headaches.

11. Sanitation $0.50

Six-page report on "How to Assure Top Sanitation in Your Processing Equipment" (Jan. 1952). This report was a preprint of one section of a practical book on food plant sanitation prepared by Association of Food Industry Sanitarians.

12. Materials Handling $1.00

Twelve-page report entitled "How Modern Materials Handling Gives New Spurt in Processing" (March, 1951). Case histories of important savings through more efficient handling are presented. And the different types of handling equipment are described and illustrated.

13. Mixing $0.50

Four-page roundup of progress in plant mixing methods and equipment, plus a forecast of what is ahead (Oct. 1953). Performance data are included as yardsticks of what can be achieved.

14. Aseptic Canning $0.75

Eight pages, including foldout picture flowsheet, describe, evaluate, and illustrate in detail the continuous, short-time, high-temperature aseptic canning process that won the 1951 Food Engineering Award. (June, 1951).

Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.
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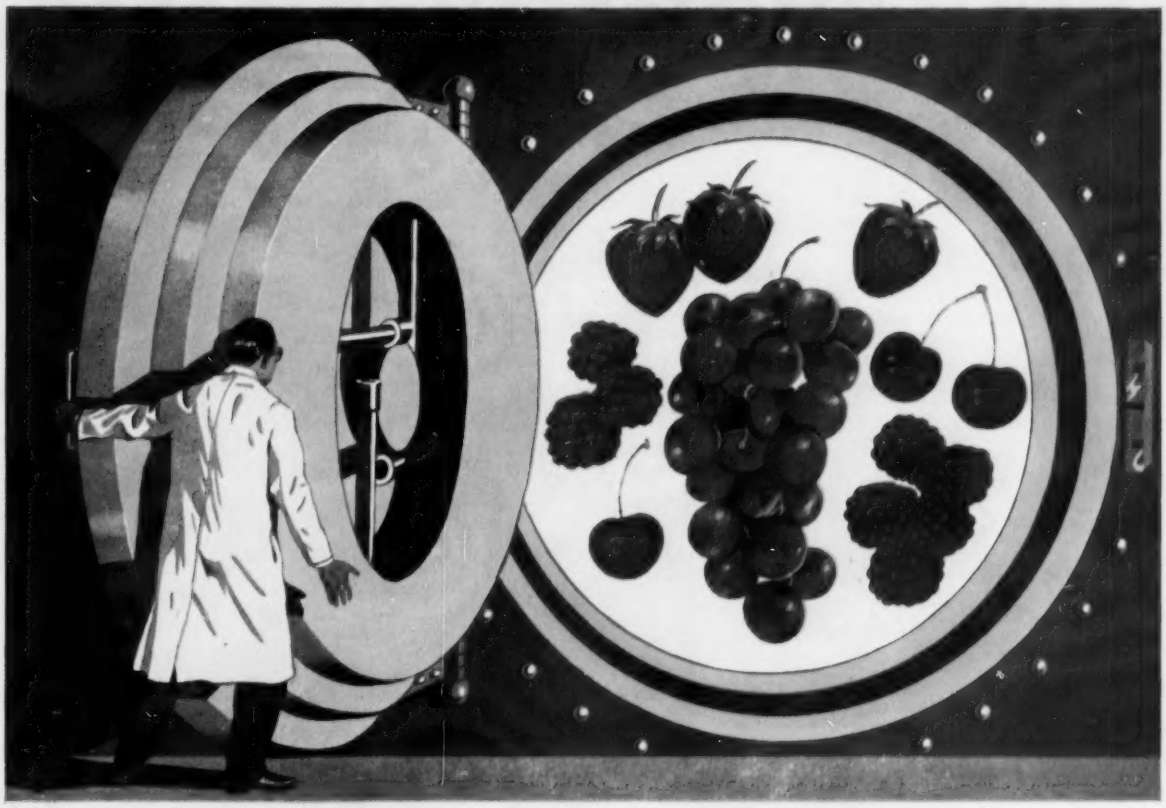

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Out on the job is where a truck earns its keep—and that's where famous Chrysler engineering pays off for Dodge truck owners! Here's how Dodge can help *you* save . . .

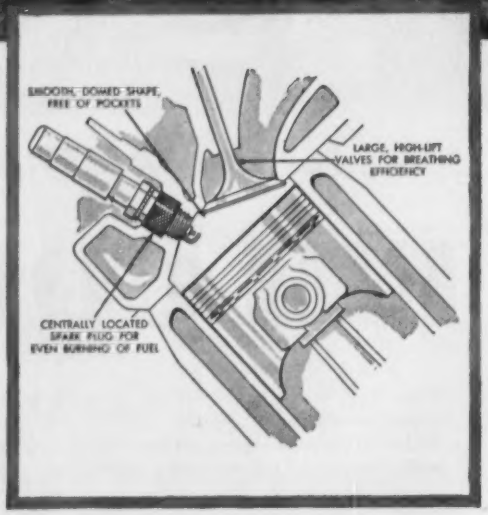
Low maintenance. You get thousands of added miles of like-new engine performance because combustion chambers have no "pockets" to accumulate carbon.

Greater gas economy. Short-stroke Power-Dome V-8 engines deliver full power on *regular* gas, give you more miles per gallon.

Shortest turning radius. Gear-before-axle steering makes turning easier, saves time.

Biggest, most comfortable cabs. Driving is safer, less tiring.

Add it all up, and add in the fact that Dodge trucks are priced right down with the lowest. You get more truck for your money—and any Dodge dealer can prove it to you!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KEEPING UP WITH THE FIELD

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Lots of Room for Frozens

"There's plenty of warehouse space for expanding frozen food production," assures Gilbert J. Stecker, president, National Assn. of Refrigerated Warehouses.

The NARW leader estimates that current public refrigerated warehouse space totals 480,000,000 cu. ft.—up 67,000,000 cu. ft. in the past 10 years.

Freezer space is only 66% occupied and cooler space 57% full at present. This points to a definite surplus at this time, President Stecker concludes.

Container Giants to Merge

Only a meeting of glass company stockholders—slated for August—now stands in the way of a merger for Continental Can Co., Inc. and Hazel-Atlas Glass Co., announces Gen. Lucius D. Clay, Continental's chairman.

Reportedly, this union will make Continental the only manufacturer producing containers in all packaging materials (metal, glass, plastics, fiber, and paper).

Total annual sales of the giant combine are expected to top $750,000,000.

Cost Index Alarms Packer

Increased costs of labor, cans, and cartons have backed canners against a wall, declares D. E. Winebrenner of D. E. Winebrenner Co., Hanover, Pa.

Citing statistics gathered by New York State and Pennsylvania Canners Assns., he predicts a 5-30% jump in canning costs this year on Pennsylvania-canned products.

To meet this boost, and still stay in the "black," packers must get another 10¢ per case, he concludes.

Army to Buy Forces' Food

A single agency will now procure food and other supplies for all the armed forces under a directive signed recently by Charles E. Wilson, Defense Secretary.

Department of the Army has been designated as this sole procurement manager, and will purchase goods through a new organization—Military Subsistence Supply Agency—which replaces supply function of the QMC.

Poultry Law Debate Gains Speed, But Battling Cuts Chances for '56

There's new steam behind the move to open poultry plants to mandatory federal inspection, but arguments as to who will get the job make it unlikely that any bill will be passed this year.

U. S. and State officials have now joined consumer and labor groups that have long demanded such a law. And all show remarkable unanimity on the need for congressional action to protect the housewife against diseased or contaminated fowl.

Broad agreement on this objective was spelled out recently in two days of hearings before the Senate Labor Subcommittee on Food & Drug Legislation. It was generally accepted that unwholesome poultry has lately become a more serious public health problem. There was wide agreement, too, on mandatory Federal inspection as the answer.

But, there agreement ended. At present, the only Federal inspection of poultry is a voluntary program carried out by USDA's AMS. About one-fifth of the 1,327 poultry plants that ship across state lines take advantage of this service, for which the participating firms, themselves, pay.

USDA officials, reversing their long-time stand against mandatory inspection, urged that the AMS program serve as foundation for any mandatory law. They saw no need for duplicating effort or personnel by establishing such inspection in another agency or under USDA's Meat Inspection Branch, which supervises compulsory inspection of all meat processing plants.

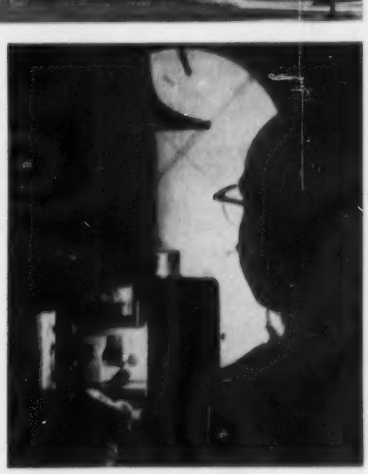
But, the packinghouse workers union and consumer groups balked, and put forth the FDA as the "consumer protection agency" they want to have handle the job. From its inception, they noted, the present voluntary program has been promoted as a "service" to processors. Thus, they warned, AMS inspectors would be more zealous in protecting industry than the consumer, if given the compulsory job.

FDA found itself squarely in the

(Turn page)

New Can Lab Starts Work

Doors have now opened for work in Continental Can Co.'s new, $7,000,000 research center, located in Chicago. The modern building, containing 260,000 sq. ft. of floor space, is fully equipped with a 6,000-volume library, can-making and closing units, and advanced chemical and physical laboratories.



Can Tester →

Typifying the up-to-date equipment with which Continental will probe today's packaging problems is this can tester. Apparatus plots contour of can lips to determine whether container shape meets prescribed design 'specs'.

Opens Northeast Brewery

Colorful ceremonies marked the recent opening of Carling Brewing Co.'s new, $24,000,000 plant at Natick, Mass. Designed for future expansion, facility will hit an eventual output of 600,000 barrels per year. The functional rock garden and waterfall (center) serve to aerate cooling water before it is returned to lake.

Poultry Law *(Cont'd)*

middle and pleaded out, arguing that it was having trouble enough keeping up with its present workloads. Instead, FDA suggested the job be delegated to USDA's well-staffed Meat Inspection Branch, rather than to itself or to AMS.

As a result of these arguments, Senator James E. Murray (Subcommittee chairman) tossed out the union-sponsored bill, which he had supported, after the hearings ended.

Then, he introduced a new bill (S.3983) requiring inspection by USDA's Meat Inspection Branch, but under standards of the Food, Drug, & Cosmetic Act.

An earlier proposal (S.3588) by Senator George D. Aiken would permit USDA's AMS to handle the job.

And now, it is over these two bills that battle lines are forming. The Aiken bill has won support from USDA and qualified backing by Institute of American Poultry Industries and spokesmen from other regional groups in the North and Southeast.

Ranged behind Murray's new bill—which the union regards as acceptable—are FDA, state food & drug officials, and housewives protective groups.

An attempt will be made to get a Senate vote before adjournment.

However, the late start on Senate hearings, the dispute over the enforcement agency, and the fact that House committee hearings have not started yet just about rule out any final legislation this year. Agitation now started, however, is bound to carry over into the congress that comes in next January.

Vanilla Bean Imports Drop New Quality Basis Needed

The heavy drop in vanilla bean imports, amounting to 44% in 1954-55 over 1950-53 figures (1,700,000 lb.), does not square with the facts, Ray Schlotterer told members of the Flavoring Extract Mfrs. Assn. of the U. S. Mr. Schlotterer is secretary of Vanilla Bean Assn. of America, Inc.

For, while consumption of this product has dropped, he continued, production in fields using the flavoring—confectionery, soft drinks, baked goods, and ice cream—has boomed.

This indicates need for a reappraisal of the Definitions and Standards to give a new quality basis for the real vanilla flavoring, he concluded.

Southland Attacks Medfly

Florida's battle against the Mediterranean fruit fly poses a serious question as to quantity of oranges, grapefruit, and some vegetables that will be available in that area for processing during the 1956-57 season.

Further, Florida officials say the medfly can become a national problem, if the fruit-borne infestation is carried to other parts of the country.

Authorities are confident, however, that the present $7,000,000 spraying program, and a strict quarantine on fruit from infected areas, will not only check the menace, but eliminate it before the 1956-57 citrus crop is harvested.

Debut for 2-Qt. Milk Bottle

Now marketed in Southern California is a new, half-gallon amber milk bottle made by Owens-Illinois Glass Co.

This latest oblong container is designed to take advantage of a growing trend among western housewives toward purchase of milk in the 2-qt. size. Heretofore, this market was satisfied only by a paper carton.

White Bread Preferences Pinpointed by AMS Study

Consumers like light, fluffy white bread, containing a high percentage of sugar, says USDA's AMS.

These facts were revealed when the Service tested breads made with five different formulas on hundreds of homemakers in Rockford, Ill.

Ladies gave the nod to a product measuring 10 cu. in. per oz. over one of 7 cu. in. per oz. They likewise voted for a 7% sucrose content over a 2% sugar.

However, researchers found no significant preference for bread containing 8% milk solids over one having 4%. Nor for a product with 5% lard over one of 3%.

Principal bread features, desired by all the interviewed housewives, are freshness—at purchase time and during storage—a pleasing taste, and absence of both doughiness and gumminess.

Krno Wins Candy Honors

The annual Stroud Jordan Award, presented for outstanding contributions to candy research, has been won this year by John M. Krno, vice-president, Corn Products Sales Co.

Mr. Krno received the prize at the recent National Confectioners' Assn. meeting in Boston.

Food Firms May Join

Merger plans for Beechnut Packing Co. and Life Savers Corp., two time-honored food firms, have been approved in principle, announce W. Clark Arkell and Edward J. Noble, respectively chairmen of Beachnut and Life Savers.

Proposal will now be presented to each board of directors and the stockholders. The two companies will combine under the name Beechnut Life Savers, Inc.

New Age of Pyramids

Lack of warehouse space in Nigeria has led to new storage methods. Here, workers cover a modern pyramid — made from bagged peanuts—with 1,200-sq.-yd. sheets of nylon. Synthetic fabric is said to give complete protection in the worst weather. Method has been used for grains and other crops, too.

Wrap Inhibitors to Get OK

Now that objections have been cleared up, the amendments to Federal Standards of Identity permitting use of mold inhibitors in certain cheeses and wrappers are expected to become effective late this month, says FDA.

Principle objector to the new ruling, Borden Cheese Co., N.Y.C., recently withdrew its protest to FDA. New law will allow addition of sorbic acid and sodium or calcium proportionate in manufacturing and packaging of natural or processed cheese in slices and wedges.

Hors d'Oeuvres

▶ The "pause that refreshes" advertising has created a tremendous business. And while there are some who do not drink Coca-Cola, there are almost no people who do not like it—as a name, as an institution, and as an "honest" product. Shows what you can do by continually making good on a simple, sincere boast.

▶ **Fifteen major chains sell better than 50% of the more than $5 billion worth of groceries bought annually by the 15 million people living within 50 miles of New York's City Hall.—Sort of breath-taking.**

▶ New scourge of Florida's citrus belt, the Mediterranean fruit fly, is being lured to a poison-bait death by oil of angelica seed. This oil has been used as a perfume in milady's boudoir, so the fruit fly isn't the first to be attracted to trouble by its motivating aroma.

▶ **Pot of Gold farms lulls its rock cornish hens into growth-promoting contentment with soothing orchestral music by Muzak. We suppose that an egg farmer would benefit by keeping his hens bouncing to strains of Beal Street boogie.**

▶ 'Tis claimed that garlic repels fleas. Apparently fleas and people have one thing in common.

▶ At its first meeting in 1862, U. S. Brewers Foundation worked out a system for collecting taxes on beer which gave the hard-pressed Union $1,000,000 in the first year. Now brewers pay more than 600 times that much in Federal excise taxes. Generous impulses sometimes turn out that way.

▶ **Know what is lager beer? Two centuries ago it was called Bavarian beer. And it was brewed in winter and stored in cool caves for the summer market. A long way of saying that "lager" means "aged."**

▶ Back about 1860, California vintners shipped wine all the way around Cape Horn to the eastern states. That, perforce, was lagered, too.

▶ **Wine was made by the Chinese before 2000 B.C. Was a time when good things fermented in China.**

*Trona is the trade mark of American Potash and Chemical Corporation.

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WRITE FOR ILLUSTRATED CATALOG E55

Sprayed Tanks Cope With Crop Emergency

Novel American construction means have been used to provide new storage space for Portugal's booming wine production. To meet the emergency created by last year's bumper crop, the government constructed 50 of these special dome-tanks—each holding 73,600 gal. Units were erected in a record 90 days by spraying concrete over reinforcing wire, held in place by inflated neoprene-nylon balloons. So successful was the result, that Portugal plans 5,000 more tanks this year. Patent holder is A. K. N. Waterval, Alexandria, Va.

QC-Guesswork Reduced By New Tests & Tools

"Quality control is the key to better business. And the QC-man today must be somewhat of a politician", Prof. W. F. Robertson, Michigan State U., told members of the National Fruit & Syrup Mfrs. Assn. at their recent Atlantic City convention.

Getting along with management, suppliers, regulatory agencies, and employees is a delicate position, he continued. And it requires a man with a good working knowledge of bacteriology, chemistry, entomology, parisitology, and sanitation.

But with all this knowledge, old-fashioned control methods rely largely on judgment and skill. Management should get their QC-man off this subjective "hot-spot", and boost his prestige by embracing the many new objective tests and equipment that assure higher product uniformity and sanitation.

Correction

In the article "Mylar Breaks Barriers to Wide Application" (FE May, p. 69), bundling machine illustrated is that of Package Machinery Co., not a Hayssen unit as stated. Both makes of machines are suitable for this operation.—The Editors.

Biscuit Bakers Elect

Following are '56 officers of the Biscuit & Cracker Manufacturers' Assn. of America:

President, G. Burry, president, Burry Biscuit Corp.; vice-presidents, A. P. Strietman, chairman of the board, United Biscuit Co. of America; H. Main, president, Sunshine Biscuit Corp.; and G. H. Coppers, president, National Biscuit Corp. W. Dietz is secretary-treasurer.

New Food Courses in Fall

Starting this September, two new courses in food problems make their debut at Chicago and New York City colleges.

At The City College, N.Y.C.: A graduate study in food engineering. Night school course will cover colloid chemistry, unit operations, flavor, and statistical methods.

Chicago's Siebel Institute offers an undergraduate program in brewing technology. Instruction in this course is heightened by operation of a complete, model brewery.

Probes Dehydro-Freezing

Frozen, pre-formed rib-eye beefsteak is sliced prior to dehydration in an experiment conducted by QMC. Researchers say resultant product is compact and stable—shows great promise for military use. (Authenticated News Photo)

World Food Shorts

$7 Million Cannery to be built at Kent, England, by Bachelors Peas (Unilever subsidiary) will employ up to 1,500 workers. Modern equipment includes electronic units for pea grading and control of can-fill, also continuous pressure cookers for total productions of 12,000 cans per min.

Synthetic Rice is latest development of Indian Central Food Technological Institute. Called cheaper and more nutritious than rice itself, new product consists of tapioca (85%) plus groundnut flour (15%), used for protein supplement.

New Research Group at Cambridge U. will step up England's study of food preservation by radiation.

Low-Temperature Process for butter fat involves melting butter at 120 F., separating water and curd, heating to 150-200 F. to remove residual water, then rapid cooling. Method has been patented by the New Zealand Dairy Products Marketing Commission.

Jordan plans construction of a $1.5 million sugar factory with annual production of 25,000 tons, according to the Ministry of National Economy, Amman.

South African Citrus may be coated with plastic if current experiments prove successful. The covering reportedly ends need for refrigerated storage and transport, and preserves fruit for six months.

Briefly...

• SOLUBLE COFFEE RESIDUES can be included in animal foods, say Rutgers U. researchers. In tests, some milk cows ate as much as 5 lb. per day without balking. But the scientists claim it's best not to mix more than 10% with the feed.

• BIOLOGICAL WARFARE may supplement chemical control of bugs in the near future, according to Chemical Week, a McGraw-Hill publication. Showing promise is a new nematode that attacks the apple-damaging coddling moth, yet harms neither fruit nor consumers.

• SUBSTITUTE FUNGISTAT for citrus fruits has been discovered by U. of California. It's a mixture of salts that produce ammonia when moistened, and is applied in either pellet or impregnated-paper-

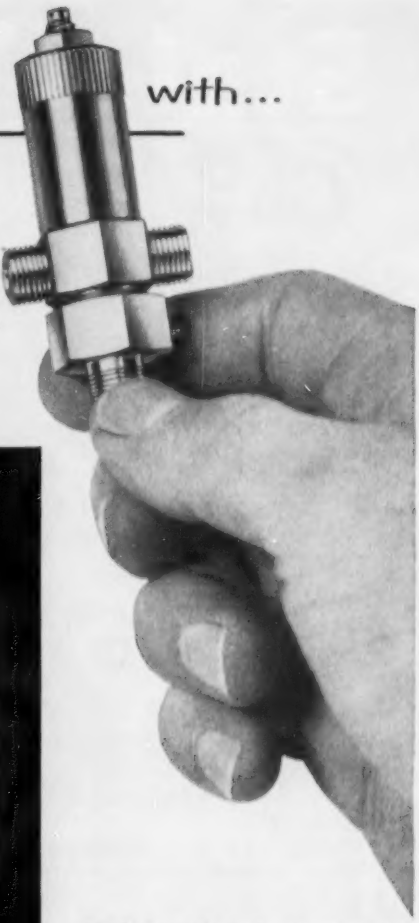
Protect against product spoilage with...

FULLY-ENCLOSED, AUTOMATIC

ALEMITE

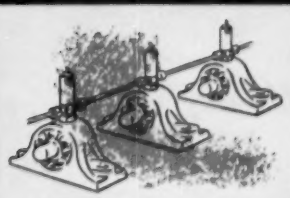
Accumatic

CENTRALIZED LUBRICATION



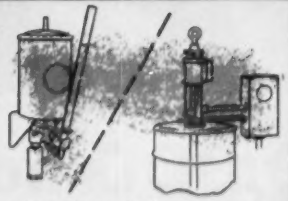
Can be built into any machine, in 4 easy steps

1. Replace grease cups or grease fittings with Accumatic fittings. (Available in same thread sizes as grease fittings, cups.)



2. Connect Accumatic fittings with copper tubing. (Alemite has tubing, clips and accessories for fast, neat installation.)

3. Connect sliding, rotary or oscillating parts into tubing system. (Flexible hose and swivels available for moving parts.)



4. Provide central pump to supply lubricant to system. (May be ordinary hand pump or fully automatic barrel pump.)

Product spoilage due to inaccurate hand lubrication of equipment is a needless waste. But with fully-enclosed Alemite Accumatic Lubrication you eliminate dripping oil and grease. Alemite keeps the lubricant where it belongs—*in the bearing!* This completely automatic system delivers a clean, exact amount of lubricant to all bearings. No over-lubrication. Serves up to 400 bearings. Accurate down to .005 cu. in. of lubricant!

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- Prevents application of wrong lubricant.
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- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers *exact* amount of lubricant to bearing.

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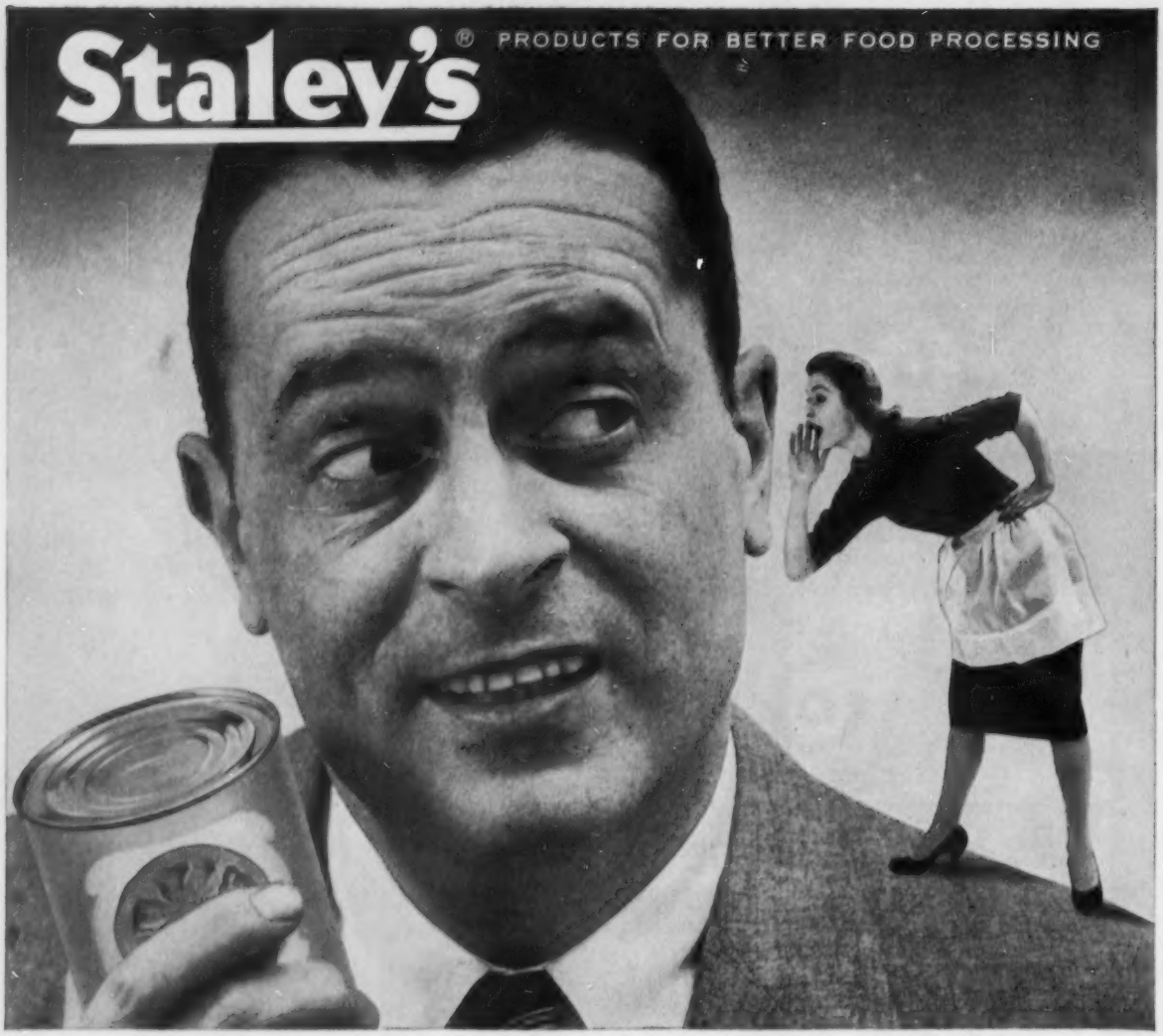

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They demand flavor! And if they don't get it, somebody's processed food brand gets the cold shoulder. One of your best flavor guarantees is Staley's Sweetose Syrup. This economical enzyme-converted corn syrup gives you *accurate sweetness control*, brings out all the natural, unmasked taste that homemakers expect. Sweetose builds sales-tempting eye-appeal too, helps hold appetizing texture and color of the original fresh food. Put Sweetose Syrup to work for you now . . . let it help give your customers the tasty goodness they demand. See your Staley representative or write us for more information.

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Regular & Intermediate Corn Syrups
Canners Starches
Refined Corn Oil
Zest®, Monosodium Glutamate
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sheet form to top and bottom of packed fruit.

• FRUIT-SUGAR RATIOS in frozen fruits and berries are being reported in a new way by USDA's AMS. Inspection certificates now carry a clear indication of this figure, if inspector is in plant during packing operations. Information will aid both processors and buyers in meeting specifications.

• **MELLORINE MARKETING is being studied by U. of Kansas under a contract with USDA's AMS. Information will include container sizes, production, pricing, promotion and advertising, and sales.**

• TRAVELING QC LAB has been put in operation in Mexico by Pepsi-Cola International. Staff of the vehicle consists of a chemist and mechanical engineer. They will give bottlers latest technical information to improve their operation.

• **WHITE BREAD marketing costs have been studied to reveal why cost per loaf has risen 70% since '46. Processing and distributing charges have zoomed 87%, says USDA, while returns to farmers have advanced only 20%.**

Action on Standards

Following actions have been taken by Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U.S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the *Federal Register*.

Samsoe cheese, FDA Standard of Identity, *F. R.*, May 3, p. 2918.

Canned peas, FDA Standards of Identity, correction, *F. R.*, May 4, p. 2980.

On carrots, peaches and radishes, tolerances of Heptachlor, *F. R.*, May 4, p. 2980.

Correction on tolerances of Dieldrin, *F. R.*, May 10, p. 3109.

On grapefruit, lemons, limes, oranges, tangerines, tangelos, and kumquats, tolerances of Malathion, *F. R.*, May 10, p. 3109.

On hops and wheat, tolerances of Zineb, *F. R.*, May 10, p. 3109.

Meats, prepared meats, and meat products, AMS proposed amendments of U. S. Standards, *F. R.*, May 24, p. 3449.

Apricots, canned, AMS proposed revision of U. S. Standards, *F. R.*, May 26, p. 3624.

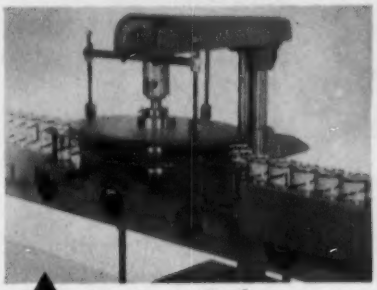
Peanuts, shelled runner type, shelled Spanish type, and shelled Virginia type, additional time for filing data on U. S. Standards, *F. R.*, June 2, p. 3799.

Spinach, frozen, additional time for filing data on U. S. Standards, *F. R.*, June 6, p. 3877.

Cheeses, processed cheeses, cheese

Coding Problem?

There's a Gottscho automatic code-dating machine for every package, every purpose



Bottom-Coder

This portable, space-saving unit imprints codes on bottom of jars, bottles, cans, etc. as part of an existing production operation. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will. ("Model TB" MARKO-CODER IMPRINTER).

Top-Coder

This motor-driven imprinting attachment places code-dates, other changeable legends on top surface of round or rectangular cans, canisters, jar covers, cartons, boxes. Attaches to conveyor or packaging machine. Gives consistently clean, sharp imprints . . . accurately positioned in any desired location on package top. (ROLAPRINTER "700" MACHINE).

Other standard Gottscho imprinting machines available for side-coding, label-coding, wrapper coding.

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Submit details of your coding problem for appropriate literature and our recommendation.

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CODING, MARKING IMPRINTING MACHINES

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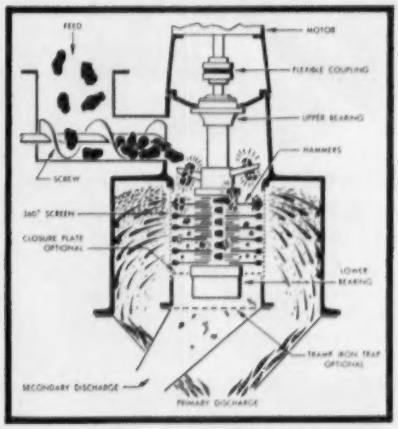

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FRICK Refrigeration Serves Big Warehouse in Kansas City

One of the cold rooms, held at 40°

Three Frick "ECLIPSE" compressors and auxiliaries at the Warehouse

The Associated Grocers lately purchased three Frick "ECLIPSE" compressors to cool a freezer room (100 by 75 by 18 ft. high) to 10 degrees below zero, and a cooler room (100 by 25 by 14 ft. high) to 40 degrees. The system, completely automatic, was installed by Smith-Williams Engineering Co., Frick Distributors in Kansas City, Mo. Charles E. Keyser, Architect; Collins Construction Co., General Contractors.

For better air conditioning, refrigerating, ice making, or quick freezing, look to

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SPEED... SANITATION... SAVINGS...

IN PACKAGING Cottage Cheese, Sour Cream, Potato Salad, Honey, Cream Cheese, Gelatine Salads

You'll speed up production, save a fortune on labor costs, and have better, more sanitary packages, with fully automatic Anderson equipment. Use Model 34-F for any size or make of nesting round cup up to and including pints . . . Model 34F-20 for sizes up to 32 ounces.

MODEL 34 F

DISPENSES—FILLS AND CAPS 18-58 PER MINUTE

Andersen equipment is preferred for simple operation and dependable performance — proved by actual daily use in dairy and food plants.

Write for Bulletin 7-10

ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

foods, cheese spreads, and related foods, amended Definition and Standard of Identity to permit use of sorbic acid and sodium and calcium propionate, *F. R.*, June 8, p. 3926.

Spinach, AMS establishment of U. S. Standards, *F. R.*, June 9, p. 3960.

Southern peas, AMS establishment of U. S. Standards, *F. R.*, June 12, p. 3983.

Pesticide chemicals; further extended dates on which statute shall become fully effective, *F. R.*, May 16, p. 3218.

On buckwheat grain, oat grain and grain sorghum, proposed tolerance of calcium cyanide, *F. R.*, May 24, p. 3461.

Schedule of Events

July

15–20—National Potato Chip Institute; Hotel Greenbrier, White Sulphur Springs, W. Va.

23–26—National Assn. of Sanitarians, annual conference & exposition; Hotel Morrison, Chicago.

31–A3—National Dietary Foods Assn.; Huntington-Sheraton Hotel, Pasadena, Calif.

August

6–17—American Assn. for the Advancement of Science, Gordon Research Conferences, food & nutrition (6-10), vitamins & metabolism (13-17); Colby Junior College, New London, N. H.

13–15—International Apple Assn., annual convention; Hotel Dinkler Plaza, Atlanta, Ga.

13–15—American Soybean Assn. and National Soybean Processors Assn., combined annual meeting; U. of Illinois, Urbana.

26–29—National Assn. for the Specialty Food Trade, Annual Fancy Food & Confection Show; Sheraton-Astor Hotel, New York City.

September

5– 7—International Assn. of Milk & Food Sanitarians, annual meeting; Hotel Olympic, Seattle.

10–12—Packaging Institute, annual forum; Hotel Statler, Cleveland.

11–14—Packaging Machinery Manufacturers Institute, machinery & materials exposition; Public Auditorium, Cleveland.

17–19—National Assn. of Bakery Sanitarians, annual meeting; Hotel Morrison, Chicago.

17–21—Instrument Society of America, annual instrument-automation conference & exhibit; Coliseum, New York City.

20–30—International Exhibition of Preserved Foods & Food Equipment; Parma, Italy.

23–26—Produce Packaging Assn., annual convention; Miami Beach, Fla.

23–28—Master Brewers Assn. of America, convention & exhibition; Conrad Hilton Hotel and International Amphitheatre, Chicago.

24–26—American Oil Chemists' Society, fall meeting; Sherman Hotel, Chicago.

27–29—National Management Assn., annual meeting & supervisory development conference; Sheraton-Jefferson Hotel, St. Louis.

28–O2—American Meat Institute, annual meeting; Palmer House, Chicago.

Armour's Modernization

—Continued from page 65

At the St. Paul plant, cartons of empty glass jars are brought to the vacuum cleaning machine, after which they are inspected and sterilized before filling. These preliminaries are keyed to a filling capacity of more than 5 jars per second.

A new X-ray unit is one example of the rigid quality controls maintained on the baby food line. It enables inspectors to spot non-standard jars.

One of the newest and fastest growing phases is Armour's frozen food operations. Today, the frosted meats' line includes some 15 consumer and 35 institution-packed items.

Some products are machine-molded, frozen, and sliced to size, ready for packaging. Others, packaged in bulk units for the institutional trade, are cuts like boneless sirloin strip steak, bone-in chops, etc., done up for portion-control merchandising. Included, too, are frozen, breaded meats.

Armour scientists have developed a modified lard with greatly improved baking qualities. (See FE Sept. '53, p. 72). It's made in a new installation at Kansas City. Special tanks form part of a process that actually changes the molecular structure of lard.

Final assembly of hundreds of finished items for scores of plant departments is speedily and accurately carried out in a new central-pack installation. Both horizontal and incline conveyors facilitate weighing, checking, and assembling of thousands of orders daily. These carriers speed products directly to loading docks.

Moreover, the modernization program has included suitable loading facilities for increased use of refrigerated over-the-road trucks, with new refrigerated loading docks at the Chicago plant—another quality safeguard.

A "piggyback" system, which combines advantages of motor and rail travel, is another late development in meat transportation (See FE Dec. '55, p. 107). Armour refrigerated trailers, loaded with fresh meat, are backed onto railroad flat cars for 320-mile overnight trips. At destination, the trailers are merely tractored off for deliveries direct to customers.

Advantages of this system—now being expanded to other points—include reduction of loading and unloading labor, less wear and tear on motor vehicles, and delivery of products in better condition, and possibly faster.

Offices Also Mechanized

Nor has the company limited modernizing to its plant operations. New

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"pushbutton" methods have also enabled it to streamline office work.

Machines at one plant, for example, perform such jobs as preparing 6,000 invoices weekly, as well as calculating and printing a payroll for 3,000 employees (figuring all deductions, including union dues and annual withholding tax statements as required by law.

They also figure profit or loss on more than 25,000 items weekly. In addition, they do sales analysis work and other special assignments.

End (Resume reading on page 66)

Which Antioxidants?

—Continued from page 77

but here an emulsion or solution of the pure material is commonly used.

All of the above-mentioned antioxidants act to inhibit rancidity, which may be either hydrolytic or oxidative in character. In a food product, this breakdown causes off-flavors, described as rancid, pungent, tallowy, oily, or cardboardy.

How Breakdown Occurs

1. *Oxidative rancidity*, often called autoxidation or atmospheric oxidation, is the most prevalent under normal conditions. Here it's thought that oxygen initially attaches at or near the unsaturated linkage, with formation of a moloxide or hydroperoxide. These products are further broken down into peroxides, then into the aldehydes, ketones, and acids that produce off-odors and off-flavors.

2. *Hydrolytic rancidity* is found in milk that has developed a cardboardy or oily flavor. Butyric and other acids are formed by the breakdown of normally occurring phospholipids. It is believed that lipases often are a factor in originating this breakdown.

3. *Reversion* occurs in vegetable and fish oils containing high percentages of linolenic acid. But it causes a flavor and odor change that is different from true rancidity. This reaction requires less oxygen than true oxidative rancidity and produces by-products with a distinctly fishy odor.

4. *Enzymatic oxidation* is that type of breakdown catalyzed by enzymes such as lipoxidases. Soybean lipoxidase is quite active at low temperatures and causes rapid breakdown of the unsaturated fatty acid in fresh soya oil.

Although the exact action of antioxidants is not understood, one theory has proved most applicable.

According to this mechanism, activated molecules of fat react with oxygen to produce activated peroxides. These, in turn, transfer their energy to other fat molecules so that long reaction chains are formed.

In the presence of an inhibitor (antioxidant), some of the active peroxides are removed from the chain by releasing their energy to the antioxidant rather than to fat molecules. Active molecules of antioxidant, which in themselves do not transfer energy to fat molecules, usually are oxidized in turn to inactive molecules. The latter then fail to transfer any energy from fat molecules.

The theory is substantiated by this observation: When an antioxidant is added to a fat which is partially oxidized, its efficiency should be considerably reduced, since the reactive peroxides already present rapidly oxidize the small amount of inhibitor added.

As a matter of fact, it is well known that it is not practical to attempt to stabilize a fat that has already started to show substantial peroxide formation.

Stability Tests

Two methods have particular value in testing the effectiveness of antioxidants:

First, there is the Active Oxygen Method, which is fairly accurate (about 10% reproducibility) and simple. Here, air is bubbled through fat samples held at a constant temperature. They are periodically checked for peroxide content, and results are reported as "AOM hours"—number of hours the fat remains stable under these conditions.

Second, there is the Schaal Oven Method. This, though difficult from the standpoint of reproducibility or results, does extend the scope of the test. Samples of fat are checked by preparing potato chips, crackers, and pastry under standard conditions and storing at 145F. Items are smelled daily by a trained panel, and results are given as days stable at 145F.

The above article is based on a talk given by the author at a recent meeting of the New York Section of the Institute of Food Technologists.

End (Resume reading on page 78)

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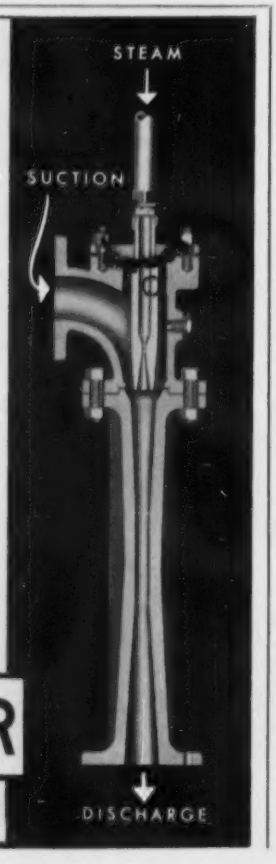


Fine-Line Density Control

—Continued from page 67

into the plates correspond in spacing to a series of rotary knives.

Fillets are dropped at random on the plates. Spring-blades then hold them down as they pass through knives. A water spray helps wash fin-

ished slices onto a transfer-inspection conveyor as cutter plates double under the machine and return to starting point.

On main process floor is the battering-breading machine (J. W. Greer Co., Wilmington, Mass.). This unit has rocker arms tipped with flat stainless springs that gently pat breaded fish to insure greater adherence of breading mix. Fish pass through the batter curtain and breading twice to obtain adequate coating.

Fryer Cuts Fatty Acids

Designs of both the fryer and cooler illustrate ingenuity of Gorton engineers. The 20-ft. fryer (built to company specifications by Artisan Metal Products Co.) is a shallow-well type, and is direct-fired with oil. Major design point is in the stainless-steel-clad pan, which is deeply corrugated for faster heat transfer.

Cooking oil enters the fryer through perforated pipes, laid in these corrugations. Thus, oil sprays down against heating surfaces and circulates away rapidly. This substantially reduces formation of free fatty acids.

Another factor that minimizes these undesirables is fryer size. The unit is purposely made small to handle just the present line capacity. And oil content of the system (225 gal.) is thus "turned over" every 8 hr.

Reserve oil is stored on the roof in two horizontal tanks (4,000 gal. each.) An automatic float switch in fryer allows gravity-flow makeup when needed.

A sump, at fryer entrance, is connected with a pump (150 gpm.) to circulate cooking oil to the perforated pipes. Approximately ⅛ of this flow (25 gpm.) is routed through a vertical, screen-tube filter (Hoffman). Here, oil passes in—and up—through 3-ft. tubes (64 of them) that are coated with a filtering agent (Super-Cel).

Gorton engineers like this type of filter because it can be back-flushed, recoated, and old coating removed—all while it's in operation.

Any large particles of burned product are removed from the oil before filtering. A stainless mesh belt, in fryer sump, "strains" them out.

Double-Blast Cooler

The 25-ft. cooler, company-built, features a double pass of air through the product. Filtered air blast (6,000 fpm.) passes down through fish in the exit half, then up in the first section. A baffle, in center of cooler, prevents air from "riding" product.

Fish leave cooler and travel over a vibrating "nubbin" grader that removes under-sized pieces. Then product drops to the packing table (company-made).

Here, boxes formed on a Package Machinery Co. unit) swing onto conveyors alongside product belt, and are filled by women. Checkweighing follows, and completed packages are overwrapped (Package Machinery Co.), and conveyed to basement.

On this level, three 20-plate freezers (American Plate Freezer Corp.) quick-freeze the product. Cartoned goods are finally palletized and lift-trucked to storage.

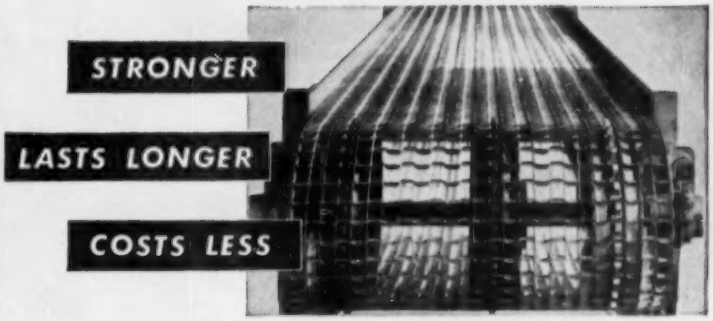
Fire Safety With CO_2

Frying systems are well known for their fire hazard. And Gorton's has accordingly adopted a highly-efficient protective device.

It comprises a centrol CO_2-cylinder supply from which feeder pipes extend to every danger point. Outlets are located at each end of fryer and cooler, in oil-filtering room, and in fume-exhaust and air-supply ducts.

Furthermore, all ducts are equipped with dampers. And in event of a flash fire, automatic controls will shut these dampers tightly and instantly stop all motors and blowers. An alarm bell likewise will sound.

End (Resume reading on page 68)



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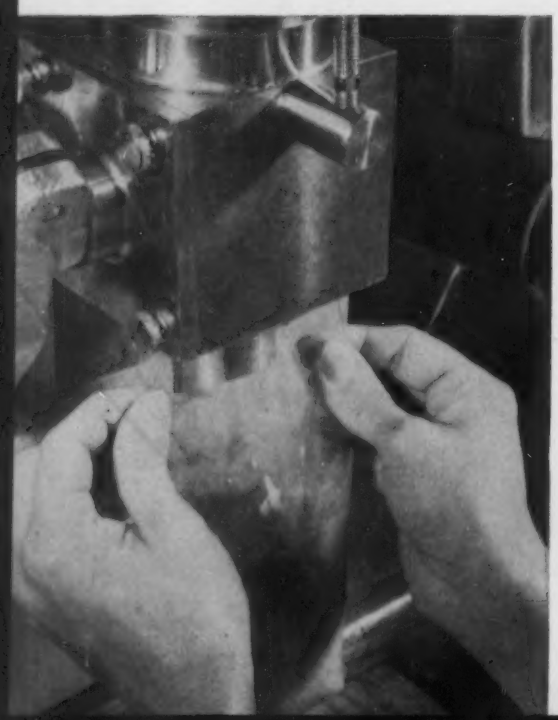

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Lactalbumin Composition by Milling Hydrophilic Colloid With Heat-Denatured Lactalbumin—R. J. Block, Scarsdale, N. Y. to The Borden Co. No. 2,738,275. Mar. 13, 1956.

Aromatised Coffee Powder by Passing Heated Aroma-Laden Inert Gas Through Soluble Powder at 60-80 C.—R. O. Blench, S. Hayling, England. No. 2,738,276. Mar. 13, 1956.

Compressed Cereal Bar Comprising Sugar, Shortening, Flour, Eggs, Salt, Flavoring—J. Cryns, Chicago, to USA.—No. 2,738,277. Mar. 13, 1956.

Ice Cream Concentrate (65% Solids) Consisting of Milk Fat, Sugar, Milk Solids Not-Fat Having at Least 40% Hydrolyzed Lactose—E. G. Stimpson and R. Whitaker, Sayville, to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,738,279. Mar. 13, 1956.

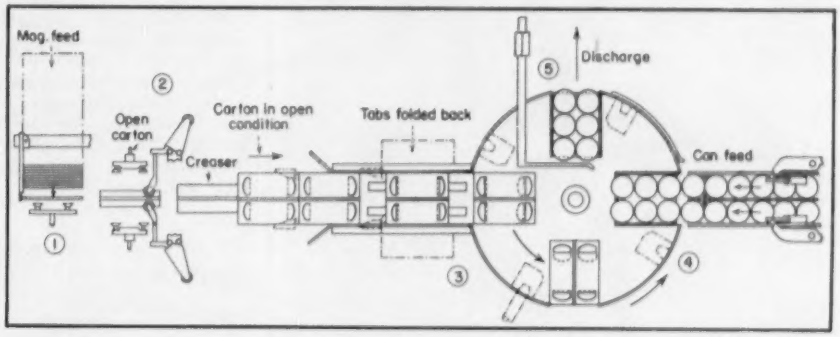
Whistle-Shaped Confection Made of Hard Candy—A. C. Hugin, Washington, D. C. No. 2,739,065. Mar. 20, 1956.

Stabilizer for Fats and Oils Consisting of 2-4-5-Trihydroxybenzoic Acid—A. Bell, M. B. Knowles, and C. E. Tholstrup, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y. No. 2,739,066. Mar. 20, 1956.

Edible Dusting Powder Comprising Anhydrous and Hydrated Dextrose, Fat—Z. Block, Larchmont, G. J. Rosner, Brooklyn, and A. H. Goodman, Great Neck, N. Y., to Doughnut Corporation of America, New York City. No. 2,739,896. Mar. 27, 1956.

Feed Mixture Comprising Dried Sterilized Protein From Aerated Settled Sewage, Whey Solids—O. Rahn, Lincoln, Nebr., to R. V. Morse, Ithaca, N. Y. No. 2,742,359. Apr. 17, 1956.

Carbonated Beverage by Adding Water to Container (Formed in Part of Pervious Filtering Material) Containing Alkali Metal Bicarbonate and



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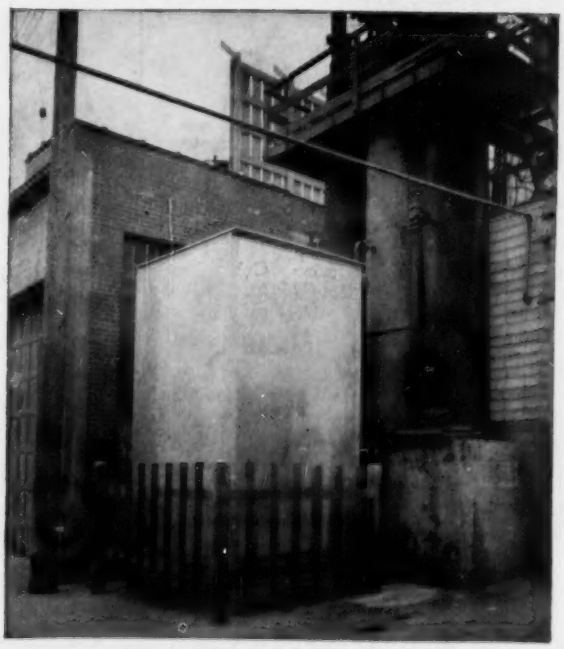
The "KING ZEERO" Vertical Header Type Coils



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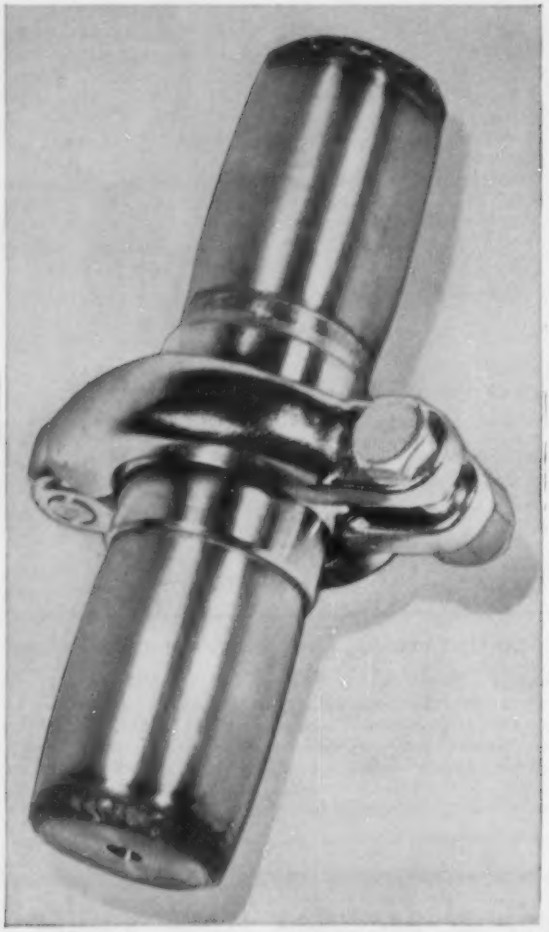

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Ion-Exchange Resin, Generating CO_2, Filtering—W. L. Hughes, Cambridge, Mass. No. 2,742,363. Apr. 17, 1956.

High-Levulose Syrup With High Viscosity by Enzyme Action of Dextran-Sucrase on Aqueous Sucrose Solution—J. Corman, H. M. Tsuchiya, and C. S. Stringer, Peoria, Ill., to USA. No. 2,742,365. Apr. 17, 1956.

Low-Sodium Salt Substitute Containing Potassium Chloride, Sucrose, Dextrose, Monocalcium Glutamate, Tartaric Acid, Calcium Chloride, Calcium Stearate—R. M. Power, Waltham, to Arthur D. Little, Inc., Cambridge, Mass. No. 2,742,366. Apr. 17, 1956.

EQUIPMENT

Automatic Egg Evacuator Having Paired Hollow Needles, Reservoir, Conduits, Suction and Air-Pressure Means—D. N. Kerven, Newark, N. J. No. 2,735,464. Feb. 21, 1956.

Orienter, Slicer for Ovaloidal Fruit Comprising Inclined Guide Chute, Fruit-Support Means, Rotary Knife Cooperating With Elongated Blade—B. H. Kellogg, Los Gatos, to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,735,465. Feb. 21, 1956.

Apricot Splitter, Pitter Employing Frame With Spaced Vertical Bearings, Slidable Rods, Horizontal Knife Having Upwardly Curved Forward End, Downwardly Extending Pit-Arresting Heel, Endless Conveyor—M. Krstinich, Sunnyvale, Calif. No. 2,735,466. Feb. 21, 1956.

Collapsible Stacking Container (and Pallet) With Bottom Member, Side Walls Having Inwardly Projecting Hinged Bottom Extensions, Swingable End Walls—C. C. Averill to Union Steel Products Co., Albion, Mich. No. 2,735,569. Feb. 21, 1956.

Apparatus for Unseating Milk-Can Covers Including Conveyor, Supporting Structure, Automatic Knocker—W. Wise, Kiel, Wis. No. 2,735,602. Feb. 21, 1956.

Ice-Cream-Flavor Inserter Employing Extrusion Valve, Syrup Pans, Flavor Valves, Control Means—H. W. Atkins, Pensacola, Fla., to Dari-Go-Round, Inc., Minneapolis. No. 2,736,274. Feb. 28, 1956.

Shredded-Cereal Machine Having Rolls, Endless Conveyor, Reciprocating and Advancing Means Alternately Operated—S. H. Perky, Keeseville, N. Y. No. 2,736,275. Feb. 28, 1956.

Pretzel-Twister Comprising Dough-Strip Feeder Having Receiving Plate, Fingers, Abutment Means, Pivotal Fingered Delivery Plate—H. S. Gipe to Quinlan Pretzel Co., Reading, Pa. No. 2,736,276. Feb. 28, 1956.

Flavor-Mixing Valve for Frozen Foods Consisting of Casing With Two Inlets, Open-Ended Cylinder, Orifices, Stirring Rotor—H. W. Atkins to Dari-Go-Round, Inc., Minneapolis. No. 2,736,534. Feb. 28, 1956.

Impeller Mechanism for Potato-Chip Fryer Including Bar Extending Across Kettle, Crankshaft, Lever—H. Schachet, Denver. No. 2,737,107. Mar. 6, 1956.

Pickle Feeder Employing Table With Upstanding Rim, Rotatable Metering Member, Vertically-Adjustable Collar, Means for Rotating Table and Meter in Opposite Directions—L. E. Kibler and R. A. Sindall, Jr., to A. K. Robbins & Co., Baltimore. No. 2,737,286. Mar. 6, 1956.

Annulus Vibratory Feeder With Symmetrical Troughs Having Arcuate Discharge Ends, Reciprocating Means—W. F. Peters, Indiana, Pa., to Syntron Co., Homer City, Pa. No. 2,737,289. Mar. 6, 1956.

Meat Tenderizer Comprising Cylindrical Gang Cutter Having Shaft-Mounted Disks With Slitting Edges—W. F. Spang, Medfield, to Needham Mfg. Co., Needham Heights, Mass. No. 2,737,684. Mar. 13, 1956.

Cutter, Reamer, Peel Ejector for Citrus Fruit—H. L. Wurgaft, Fullerton, Calif. No. 2,737,989. Mar. 13, 1956.

Hand Truck for Transporting Banana Bunches—W. A. Reich to A. Reich & Sons, Inc., Kansas City, Mo. No. 2,738,086. Mar. 13, 1956.

Lid Assembly for Popcorn Kettles—S. M. Waas to Manley,

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Inc., Kansas City, Mo. No. 2,738,156. Mar. 13, 1956.

Dairy Equipment Consisting of Combined Refrigerated Milk-Storage Tank and Pasteurizer—F. J. Zamboni, Paramount, Calif. No. 2,738,170. Mar. 13, 1956.

Ultrasonic Device Employing Power Source, Treating Chamber, Transmitting Member, Reflector—N. E. Spiess, Jr., Oakdale, and H. L. Jackson, Babylon, to National Dairy Research Laboratories, Oakdale, Islip, N. Y. No. 2,738,172. Mar. 13, 1956.

Fish Filleter Including Frame With Inclined Pulleys, Open-Bottom V-Shaped Conveyor, Vertical Endless Band Saws, Positioning Means—C. B. Stevenson, Wilmington, and J. A. Hodges, Long Beach, Calif., to H. R. Pauley, Los Angeles. No. 2,738,544. Mar. 20, 1956.

Fish Skinner Having Power Conveyor, Band Saw, Spring-Loaded Hold-down Belts, Control Means—C. B. Stevenson, Wilmington, and J. A. Hodges, Long Beach, Calif., to H. R. Pauley, Los Angeles. No. 2,738,545. Mar. 20, 1956.

Poultry Cleaner Comprising Stationary Shower Stall, Annular Row of Shackle-Suspending Devices, Poultry-Receiving Shackles, Abutment Within Stall, Synchronized Rotation Means—R. S. Zebarth, Hickman Mills, to Gordon W. Johnson Co., Kansas City, Mo. No. 2,738,547. Mar 20, 1956.

Sampler for Solids Stream Consisting of Rectangular Cutter, Traversing Means—W. T. Senkowski, Philadelphia. No. 2,738,679. Mar. 20, 1956.

Produce Coater Employing Conveyor, Wiping Roller, Reciprocating Dispenser—R. D. Gerwe, Lakeland, Fla., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,738,761. Mar. 20, 1956.

Bun Slicer With Guide Channel, Laterally Spaced Ribs, Blade—A. Wadoz, Milwaukee. No. 2,738,817. Mar. 20, 1956.

Continuous Bottle Feeder Including Guide, Carrier With Pockets, Movable Fingers—M. Vamvakas, Maywood, and C. C. Dungfelder, LaGrange, Ill., to Barry-Wehmiller Machinery Co., St. Louis. No. 2,738,866. Mar. 20, 1956.

PROCESSES

Measuring Hardness of Water by Change in Conductivity of Ion Resin—W. Juda, Lexington, to Ionics, Inc., Cambridge, Mass. No. 2,736,637. Feb. 28, 1956.

Inter-esterifying Fatty Esters by Mixing With Aqueous Alkali-Metal-Hydroxide Catalyst, Reducing Moisture to Below 0.02%—G. W. Holman, T. B. Laycock, Jr., and R. L. Wille, to Proctor & Gamble Co., Cincinnati. No. 2,738,278. Mar. 13, 1956.

Inhibiting Browning of Raw Edible Plant Tissue With Adenosine Triphosphate—R. U. Makower and S. Schwimmer, Berkeley, Calif. to USA. No. 2,738,280. Mar. 13, 1956.

Stabilizing Fats and Oils With Phenolic Oxidation Inhibitor, Alkylene Polyamine Synergist—J. A. Chenicek, Bensenville, and R. H. Rosenwald, Western Springs, Ill., to Universal Oil Products Co., Chicago. No. 2,738,281. Mar. 13, 1956.

Producing Dextrin by Controlled Enzymolysis of High-Amylopectin Starch, Following Reaction Viscometrically, Inactivating α-Amylase, Recovering Product—R. L. Lohmar, Jr., and F. B. Weakly, Peoria, and G. E. Lauterbach, W. Lafayette, Ind., to USA. No. 2,738,305. Mar. 13, 1956.

PACKAGING

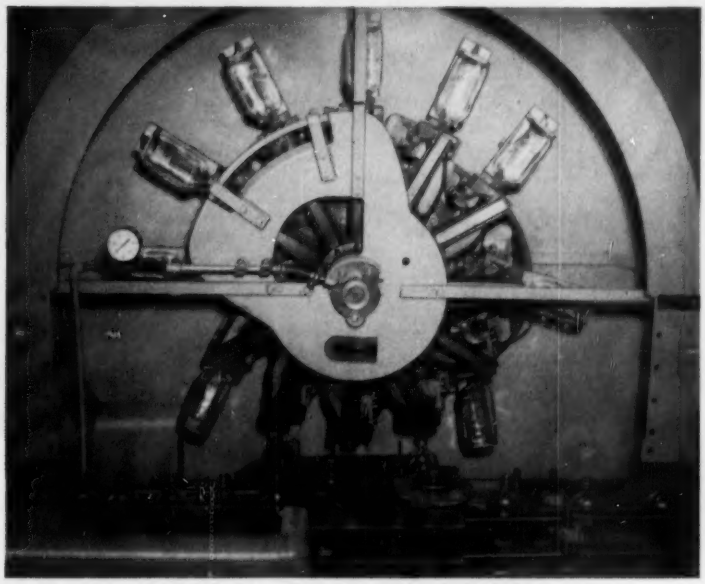
Ice-Cream Sandwich Carton With Rectangular Sleeve, U-Shaped Insert Having Base, Side Flaps, Upstanding Members With Inwardly Projecting Hinged Tabs That Hold Wafers to Receive Filling—R. M. Gill, Charlotte, N. C. No. 2,734,675. Feb. 14, 1956.

Pouring-Spout Attachment for Fluid Container—S. J. Carnes, Camden, Ark. No. 2,735,594. Feb. 21, 1956.

Bottle-Case Filler Consisting of Receiving and Bottom Loading Units—A. L. Thurman, Knoxville, Tenn. No. 2,735,599. Feb. 21, 1956.

Frozen Stick Confection Having Pivotal Bottom Shield Through Which Stick Extends—D. A. Taylor, Wadsworth, Ohio. No. 2,735,778. Feb. 21, 1956.

PNEUMATIC'S **ROTA CLEANER**



BLASTS IT LOOSE AND "VACS" IT OUT!

It will handle from ½ pints to full quarts, as fast as 120 per minute . . . round or flask shape bottles. A gentle, positive feed transfers the bottles to the rotary mechanism where they are inverted and "purged" of all foreign material by a two way air action — using air pressure to shake dirt loose and vacuum to draw it out. Once around and the container is delivered back to the conveyor, clean as a whistle, ready to fill.

The full details are given in Bulletin 112 — write for it and get all the facts on the ultimate in modern cleaning efficiency of new glassware.

PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*

PNEUMATIC

Packaging and Bottling Equipment

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CORN STARCH . . .
. . . CORN SYRUP
. . . REFINED CORN OIL
. . . DEXTROSE

Among food processors using Clinton products, you'll find them all — canner, packer and baker . . . brewer, candy and ice cream maker.

All these food processors have one thing in common: They know that *quality* processing requires *quality* ingredients. For many years, Clinton has had a reputation for producing the very best in dextrose (Clintose), corn starches, corn syrups and refined corn oil for the food industry.

That's why our customer files hold some of the best-known food names in America. If *your* name's not there, it ought to be! Can we get together soon?

and remember . . . technical service in connection with your specific problems is available upon request.

Quality products

FROM THE WORLD'S CORN CENTER

CLINTON

CLINTON CORN PROCESSING COMPANY
CLINTON, IOWA

Container Nesting Mechanism Comprising Horizontal Rotatable Table, Vertical Tubular Accumulator Pockets, Pusher, Guide Member, Container Counter, Clutch—J. F. Earp to Ex-Cell-O Corp., Detroit. No. 2,736,149. Feb. 28, 1956.

Apparatus for Forming Containers From Thermoplastic Strip Also Fills, Seals, Cuts the Units—T. Loew, Stamford, Conn., to Kraft Foods Co., Chicago. No. 2,736,150. Feb. 28, 1956.

Transfer, Printing Means for Bottle Closures Employing Engaging Member, Motion-Transmitting Means, Printing Type, Ink Supply—W. J. Vedder, Flushing, to Oswego Falls Corp., Fulton, N. Y. No. 2,736,258. Feb. 28, 1956.

Multiflow Filler Nozzle for Plastic Foods Having Outer, Inner Tubes, Supply Passages, Ribs—R. F. Anderson, Rockford, Ill. No. 2,736,480. Feb. 28, 1956.

Laminated Wrapper for Moisture-Containing Foods Comprising Outer Flexible Sheet With Moisture-Proof Adhesive, Intermediate Absorbent Layer, Flexible Inner Sheet of Moisture-Vapor Permeable, Grease-Resistant Material—T. R. Massey, Appleton, to Marathon Corp., Rothschild, Wis. No. 2,737,467. Mar. 6, 1956.

Collapsible Produce Carton Having Side Walls Connected by Corner Members, Flexible Transparent Cover—K. T. Buttery to Sutherland Paper Co., Kalamazoo, Mich. No. 2,738,057. Mar. 13, 1956.

Hood-Type Dairy Closure With Outer Foil Layer, Inner Foldable Sheet, Flat Bottle-Mouth Spanning Portion, Annular Section, Crease Line—C. L. Wenzel to Mid-West Bottle Cap Co., Belvidere, Ill. No. 2,738,089. Mar. 13, 1956.

Produce Container of Molded Pulp Having Rectangular Open Top, Outwardly Extending Lateral Flanges, Shoulder-Forming Offset Portions — W. E. Hatch, Waterville, to Keyes Fibre Co., Portland, Me. No. 2,738,914. Mar. 20, 1956.

Pour-Hole Closure Consisting of Perforated Fabric Tape With One Gummed Surface, Outer Tape Having Pressure-Sensitive Adhesive—T. B. R. Peters, Boulder, Colo. No. 2,738,916. Mar. 20, 1956.

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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If you've got a mean kraft packaging problem, tough-tempered FROSTKRAFT will whip it down to size. Your FROSTKRAFT representative has the experience to help you . . . right now . . . why not call him?

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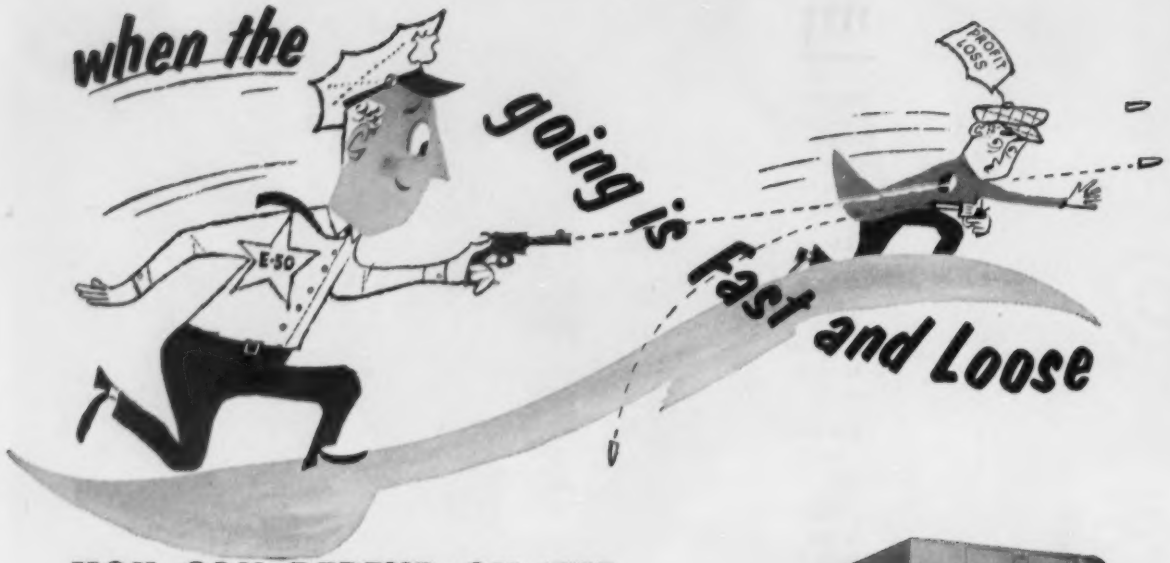


YOU CAN DEPEND ON THE Richardson E-50!

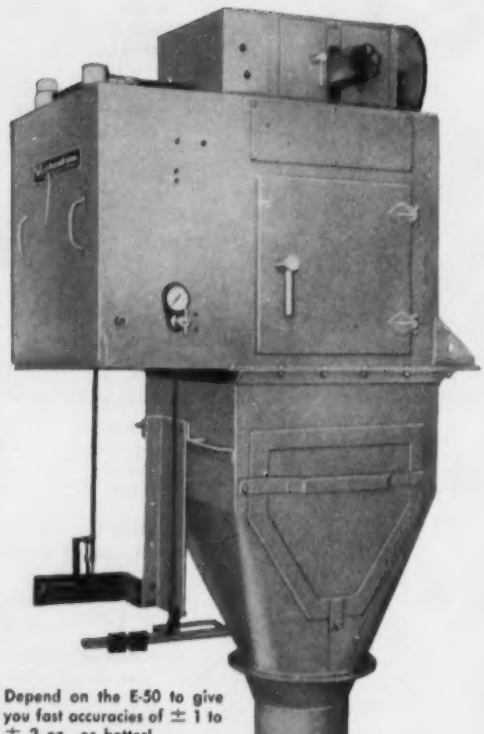
When the weighing is fast and the materials are loose (or even sluggish!), and you're having a running battle with profit loss from weight inaccuracy or the high cost of bagging and scale upkeep . . .

here's one scale that won't let you—or your profits—down!

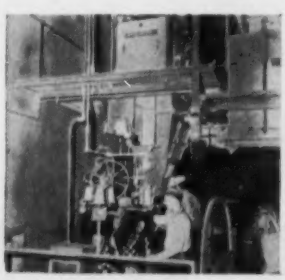
IT'S DEPENDABLE! The E-50's work-horse dependability makes it the perfect choice for any plant *where output vitally depends on the perfection of the bagging scale.* And upkeep is low! You'll find Richardson Scales still in operation after 30 and more years of service.

IT'S FAST, ACCURATE! With the rugged, completely automatic Richardson E-50 you'll get high speed bagging with accuracies *that never before were a practical possibility*—up to 1/10 of 1% under optimum conditions.

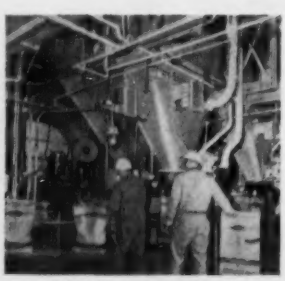
IT'S VERSATILE! Unique design permits the weighing of hundreds of food, chemical, grain and other materials. The E-50 is equally efficient as an independent bagging machine, or as an integral part of a co-ordinated production line packaging system. Don't let weight inaccuracy and bagging costs pick your pockets. Find out about the scale that really unties production tie-ups—Richardson E-50. Write today for free illustrated bulletin #3749A that tells the whole cost-saving E-50 story!



Depend on the E-50 to give you fast accuracies of ± 1 to ± 2 oz., or better! Bagholders, manual or air-operated, are available.



Duplex Model E-50 bags poultry mash up to twenty-two 50-lb. bags per min. at leading feed mill.



Ten 50-lb. bags per min. of antibiotic are delivered from Duplex E-50 in major pharmaceutical plant.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

1720

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Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit • Houston
Memphis • Minneapolis • New York • Omaha • Philadelphia
Pittsburgh • San Francisco • Wichita • Montreal • Toronto • Havana
Mexico City • San Juan

Men & Companies

John Weber has been appointed chief operating engineer at F. & M. Schaefer Brewing Co., Brooklyn. John Wolf, who retired from the post, had been with Schaefer since 1933.

Industry

Beech-Nut Packing Co., Canajoharie, N. Y., and Life Saver Corp., Port Chester, N. Y., have "approved in principle," a plan to merger. The consolidated company would be Beech-Nut Life Savers, Inc.

Burgie Vinegar Co. has been sold to partnership consisting of Messrs. Abraham, Rice, Humphreys, and Mrs. Cooper.

Butoni Foods has established a new branch in Los Angeles —Butoni Foods West Coast, Inc.

Canada Packers Ltd. has acquired an interest in Wilsil Ltd., Montreal packing and provision firm.

Cleveland Fruit Juice Co. and J. Hungerford Smith Co., Rochester, will build a $1 million plant to produce flavorings and process fruit for soda fountain and ice cream trade.

Dragoco Inc., of West Germany, producer of food and beverage flavoring, has established a U. S. division, offices in New York City.

General Foods Corp. has purchased Florence Foods Inc., Florida citrus concentrate plant.

J. Hungerford Smith Co. is undertaking a $1 million expansion program in Humbolt, Tenn.

Hunt Foods Inc. has become a subsidiary of the Ohio Match Co. Hunt will also be making use of a new warehouse, being built by the Burlington R. R.

La Choy Food Products, Archbold, Ohio, announces plans to expand present production facilities more than 50%.

Libby-McNeill & Libby plans a $2 million expansion of its Sacramento plant.

Battle Creek Food Co. has sold a controlling interest to George and Eugene McKay.

National Biscuit Co. will convert its biscuit and cracker bakery, Buffalo, N. Y., into a pet food plant.

Pepsi Cola Co. has purchased the 500 Park Ave. Bldg. from the City of New York, completed a $186,000 expansion program in Albany, N. Y., and opened new plants in Atlanta and Oklahoma City.

Phillips Packing Co., Inc., has expanded its frozen foods quality control organization. It now covers the complete line of processed food products.

ReaLemon-Puritan Co., Chicago, has acquired a Florida lime processing plant. It is located on the south campus of Miami U.

Red Dot Foods, Inc., has acquired potato chip plants from Curtis Candy Co., at Chicago, and National Biscuit Co. at York, Pa.

Spreckles Co. has sold its 50% interest in Pampanga Sugar Co., Inc., to **Philippine Planters Investment Co., Inc.**

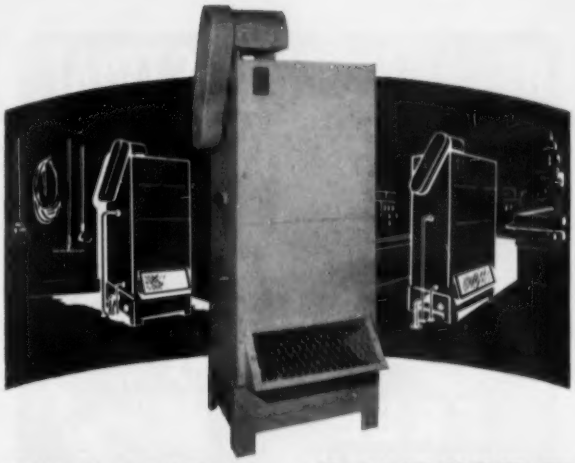
Tea Council announces appointment of Gerard L. Brant as executive director.

Swift & Co. will construct a $450,000 sales center and branch meat processing plant in Buffalo.

Personnel

Karl Anderson has been elected v.-p. of Monarch Finer Foods.

Charles E. Baker and **Gaius W. Diggs** are now executive



INSIDE....OUTSIDE

there's a place in every food plant for

AQUACOOLERS

"Ambidextrous" is the word for Marley's induced draft counterflow Aquacooler. On the one hand, it's ideally suited for indoor applications in food processing plants. On the other hand, the Aquacooler is equally adaptable to installations that call for roof-top location. In either case, Aquacooler saves more than 95% of the cooling water required for refrigeration or air conditioning in food processing plants.

The key to Aquacooler's indoor-outdoor adaptability is its centrifugal blower type fan. Of more than adequate capacity, and whisper-quiet in operation, this fan moves air so silently and efficiently that Aquacooler can literally be located wherever venting ducts can be run.

Top performance is assured by the combination of pressure spray and MarPak® nailless filling that achieve maximum water break-up and longer air-water contact. Long service life, too, is a sure thing, thanks to exclusive MarClad finish — a high-temperature, baked plastic finish that defies the corrosive effects of acids, alkalies, and water. To get the details on all Aquacooler models for services from 3 to 15 tons —

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Choose from the complete selection of precision Delavan Industrial Spray Nozzles. Literally thousands of types and capacities designed for your application.

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Catalog 32 will help you select the right industrial nozzle for your specific requirements. Details consist of applications, features, capacities, spray angles and physical dimensions. Fully illustrated. Write:

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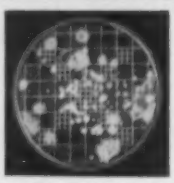
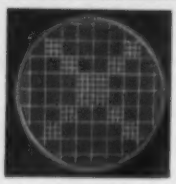
WEST DES MOINES, IOWA

STOPS GERMS DEAD



Surface of Ordinary Wax Shows Millions of Bacteria Per Sq. In.

CONTROL TESTS
Using Demon Sanitizing Floor Wax against an ordinary water emulsion wax proves that Demon reduces the bacteria count by 98%. While bacteria continued to thrive on the floor waxed with ordinary wax . . . they were "Stopped Dead" on the area with Demon Sanitizing Floor Wax.



Demon Sanitizing Floor Wax Practically Eliminates Bacteria Growth

DEMON SANITIZING FLOOR WAX
COMBINES SAFETY WITH BEAUTY!

Demon Sanitizing Floor Wax not only promotes health and safety, but it protects and beautifies at the same time. Besides being tough, durable and quick drying, Demon Sanitizing Floor Wax has many features not present in ordinary waxes. Demon is a high quality water-emulsion floor wax with excellent slip-resistant and non-scuff qualities. Demon dries to a brilliant, long-lasting lustre and can be re-buffed periodically to re-new the gloss. Occasional damp mopping actually rejuvenates its germ inhibiting powers and restores a lustre to the floor. Demon Sanitizing Floor Wax is easily and quickly applied to any type of surface and should be used wherever public health is an important factor.

DEMON Sanitizing Floor Wax is registered under The Federal Insecticide, Fungicide, and Rodenticide Act

SEND FOR FULL INFORMATION

***the* PENETONE co.**

BOX FE-756 Tenafly, New Jersey

v.-p. and v.-p. for sales of Knox Crutchfield, Inc.

Robert A. Bintz and **Lester Klempner** are new asst. v.-p.'s of National Starch Products, Inc.

William E. Carey is now v.-p. and director of sales for Ocoma Foods Co., Omaha.

Harry Gilson, treasurer of F. B. Washburn Corp., Brockton, Mass., has been re-elected president of the New England Manufacturing Confectioners' Assn.

B. J. Greer, R. J. Keith and **Dean McNeal** are now executive v.-p.'s of Pillsbury Mills, Inc.

Don L. F. Grantham is now president of Meadow Gold Products Corp. and Louis Cherry Ice Cream Co.

Dr. Frank Hildebrand is now v.-p. of General Mills.

Donold B. Lourie has been installed as chief executive officer of Quaker Oats Co. He succeeds John Stuart, resigned.

Milward W. Martin and **Henry W. Martin** have been elected director, and president of Pepsi Cola International.

Dr. Bruce H. Morgan is now Deputy for Radiation Preservation, Office of Scientific Director, Quartermaster Food & Container Institute for the Armed Forces, Chicago.

Dr. Edna Sostman, asst. prof. of home economics of Douglas College, was elected vice-chairman of the New Jersey Nutrition Council.

R. C. Wagner, president of Clinton Corn Processing Co., is new v.-p. of Standard Brands, Inc. Clinton Corn Processing is a new division of Standard Brands Inc.

A. Rollin Staley resigned as v.-p. of A. E. Staley Mfg. Co., Decatur, Ill.

George J. Stewart, v.-p. and director of Swift & Co., has retired because of ill health. **J. Townley** and **J. B. Miller** were elected vice-presidents, and **Harold E. Wilson** will become associated with **O. E. Jones,** executive v.-p.

Leslie Stone was named a v.-p. and member of board of Borden Co.'s South East Ice Cream District.

Harvey Swinehart is now Central Division Sales Manager for Mullers Inc., Grand Rapids, Mich.

Douglas C. Townson has retired as chairman of board of Curtice Brothers Co. He is succeeded by Howard T. Cumming.

Associated Industries

American Can Co. will spend $27 million on facilities to process plate from continuous strips. Firm has also opened a new food container division, of which Roscoe M. Roberts will be general manager.

Armstrong Cork Co.'s glass container plant at Dunkirk, Ind., will expand and install equipment for fusing multicolored ceramic decorations on glass bottles.

Arthur D. Little, Inc., announces election of its science director, Dr. Howard O. McMahon, as v.-p. of Cambridge, Mass., Industrial Research Co.

Bakelite Co. announces appointment of T. W. Sharp as asst. general sales manager.

Blaw-Knox Co., Pittsburgh, has appointed two v.-p.'s to manage firm's newly integrated groups. S. J. Moran will be v.-p. and general manager of foundry and mill machinery operations, and E. C. Rook will be v.-p. and general manager of fabricated products operations.

Durethene Corp. has started production in its new plant devoted exclusively to manufacture of Polyethylene film.

Elgin Mfg. Co., Elgin, Ill., has appointed Edward Johnson as v.-p. in charge of manufacture of the newly acquired Elgin-Wrap machines.

General Plastics Corp., Paterson, N. J., and American Durafilm Co., Newton Lower Falls, Mass., have been named distributors for Du Pont's "Armalon" tetrafluoroethylene single-coated glass fabrics.

Glass Container Manufacturers Institute, Inc., has elected S. B. De Merell president.

Metro Glass Co., Inc., has appointed F. K. Rodewald v.-p., and J. P. Clarke branch manager, of the newly established Rochester office.

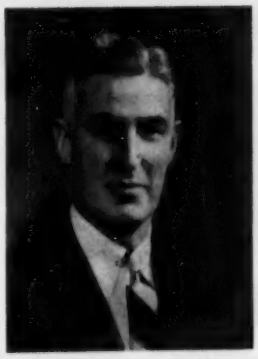
Oakite Products, Inc., has elected J. Justin Basch v.-p.

Petroleum Chemicals, Inc., Lake Charles, La., has contracted Foster Wheeler Corp. to design and construct a $12 million plant.

Pfaudler Co., Rochester, has formed a new company to manufacture brewhouse equipment in Australia.

Plax Corp., Hartford, Conn., has produced a thin-wall polyethylene bottle stated to offer most advantages of standard wall container while being lighter in weight.

Packaging Institute announces election to board of Frank W. Cray, v.-p. of International Printing div., Interchemical Corp.



James P. Delafield has been named to the newly created office of v.-p., sales and consumer services, for General Foods. Mr. Delafield formerly was marketing manager for GF's Birds Eye division.

Rockwell Mfg. Co., Pittsburgh, announces appointment of Gilbert T. Bowman as general manager, J. W. Northcutt as Southern regional sales manager, and Jack H. Walters as product manager, petroleum and industrial liquid meters.

St. Regis Paper Co. announces election of Folke Becker director.

F. J. Stokes Machine Co., Philadelphia, has changed its name to F. J. Stokes Corp.

Thomas A. Edison, Inc., announces appointment of Robert H. Weeks, Jr. as New York district manager for the Edison Storage Battery div.

Tyron, Inc., has been organized for industrial research, development, and manufacture in mechanical and chemical processes.

Waxed Paper Institute, Inc., has appointed Robert Halford, sales manager of Fabricon Products, River Rouge, Mich., chairman of the board.

Roy Moore, Jr. has taken over as v.-p. and general manager of Canada Dry Ginger Ale, Inc. Mr. Moore has served as v.-p. in charge of manufacturing at Canada Dry 1949-1954.

Deaths

H. Watson Coaker, 93, proprietor of Coaker & Co.

Benjamin H. Detwiler, 50, president of Borden's Farm Products, of New Jersey, Inc.

Arthur E. Meister, 52, manager of Toledo, Ohio, sales branch of Creamery Package Mfg. Co.

Marcus Munsill, 63, director of Borden Co. since 1935, and great grandson of company's founder.

Joseph E. Pollard, 78, former sales manager for Eastern Canada of Quaker Oats Co. of Canada Ltd.

Gordon A. Stouffer, 51, chairman of board of Stouffer Corp.

NO JOKER IN THIS DECK!

IS THE **COMPLETE** LOW-TEMPERATURE PIPE INSULATION . . . PROVIDES **PERMANENT** INSULATING EFFICIENCY **WITHOUT** ADDITIONAL VAPOR BARRIERS

Here are the **"STRAIGHT"** facts about **VAPO-WALL**

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The Most Nearly-Perfect Insulating Material Ever Developed

Vapor barriers increase cost . . . reduce efficiency. Specify Vapo-Wall and make sure of completely moisture-proof, permanently effective insulation without added vapor seals. Pipe, vessel and fitting covers available in 8 standard thicknesses. Write today for complete information.

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New Catalogs and Bulletins
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PLANT ENGINEERING

Can-Body Maker

Describes design and operating features of a can body maker. Unit handles sizes from 2⅛ to 4⅛ in diameter, and lengths to 5⅛ in. 4 p.—Baldwin-Lima-Hamilton Corp., Hamilton, Ohio. (213A)

Custom Fabrication

Pictures various custom-made pieces of equipment and details special skills available for this type of work. Company specializes in alloy steel metal fabrication. 30 p.—S. Blickman, Inc., Weehawken, N. J. (213B)

Grain Equipment

Considers wide line of general equipment for use in graineries and mills. Units include scales, moisture testers, feeders, cleaners, carloaders, and elevators. 1955-56 Catalog, 138 p.—Burrows Equipment Co., Evanston, Ill. (213C)

Fire Pumps

Colorful bulletin blueprints over 120 different types of fire pumps. Charts aid selection. Single and multi-stage centrifugal units are covered. Bulletin B-1500, 36 p.—Food Machinery and Chemical Corp., Peerless Pump Div., Los Angeles. (213D)

Dehumidifying Facts

Treats of what humidity is and how it may be controlled in warehouses, offices, laboratories, and plants. Units of varying capacities are pictured. Bulletin 496, 6 p.—Abbeon Supply Co., Jamaica, N. Y. (213E)

Hydraulic Ash-Handling

Concerns design, operation, and construction of a line of abrasion-resistant pumps for use in hydraulic ash-handling systems. Diagrams and cut-aways show all features. Data Sheet Pa, 12 p.—Allen-Sherman-Hoff Co., Wynnewood, Pa. (213F)

Compact Motor-Pumps

Gives engineering details on a line of corrosion-resistant motor pumps. Units are specifically designed to handle "problem" fluids at heads to 190 ft., capacities to 200 gpm. Bulletin 1050, 4 p.—Chempump Corp., Philadelphia. (213G)

Propeller Fans

Describes applications for a line of belt-driven tubeaxial fans. Units are said to handle corrosive and explosive fumes and abrasive dusts in high temperature and humidity conditions. Bulletin 620, 6 p.—Robbins & Myers Inc., Springfield, Ohio. (213H)

Electric Brakes, Clutches

Charts list specifications and selection date for a line of electric brakes, clutches, and clutch-brakes. Drawings show construction details. Form WEB 6212, 8 p.—Warner Electric Clutch & Brake Co., Beloit, Wis. (213I)

Packaged Waste Treater

Depicts compact tank unit for clarifying plant water, reclaiming process water, and valuable ingredients, and eliminating pollution. Bulletin 315-92, 4 p.—Chain Belt Co., Milwaukee. (213J)

Porcelain Plywood

Bulletin gives facts on unique porcelain-faced plywood building panels for interior and exterior use. Available colors are shown, and accessory aluminum moldings pictured. 4 p.—U. S. Plywood Corp., New York City. (213K)

Feedwater Treatment

Technical discussion covers all phases of boiler feedwater treatment. Article treats of both multi-bed and mixed-bed ion-exchange units and presents case histories to point up details. Pictures, drawings, and charts illustrate facts. Technical Reprint T-140, 24 p.—Graver Water Conditioning Co., New York City. (213L)

Stainless Piping

Describes methods for bending and joining stainless steel pipe, and lists available fittings. Charts show analyses, dimensions, and weights of the special alloys. Bulletin TB-410, 8 p.—Babcock & Wilcox Co., Beaver Falls, Pa. (213M)

Remote Weighing

Informs on an electronic scanning device that automatically transmits weighing data from scales to office. Signals can be recorded on punch cards, tapes, electric typewriters, and other office equipment. Form 2975, 8 p.—Toledo Scale Co., Toledo, Ohio. (213N)

Multi-Purpose Valves

Describes and pictures a series of ¼-in., 3-way valves for use on air, oil, water, and Freon lines. Fast-acting control unit is available with button, lever, solenoid, and foot-pedal actuators. 2 p.—General Gas Light Co., Kalamazoo, Mich. (213O)

Mixing Valves

Considers construction and features of a water mixing valve, thermostatically controlled for close temperature regulation. Bulletin 362, 4 p.—Powers Regulator Co., Skokie, Ill. (213P)

Cooling Coils

Extensive charts list selection data for a line of direct-expansion cooling coils. Catalog also describes construction of the equipment. Bulletin DE-200, 8 p.—Halstead & Mitchell, Pittsburgh. (213Q)

Line of Motors

Pocket folder gives essential data on a range of motors that includes induction, dc, gearhead, splash-proof, and explosion-proof types. Ratings up to 400 hp. are available. 24 p.—Master Electric Co., Dayton, Ohio. (213R)

Boiler Series

Detailed drawings illustrate operation of a series of Scotch, marine-type boilers. Models range from 6 to 200 hp. 28 p.—James Leffel & Co., Springfield, Ohio. (213S)

Motor Control Center

Depicts in detail all features of a compact control center for motor switches. Extensive charts aid selection of various types of starters. Bulletin GEA-6367, 24 p.—General Electric Co., Plainville, Conn. (213T)

Can-End Liner

Describes advantages of an automatic machine for applying lining compounds to can ends. Unit processes ends in sizes from No. 202 to 404. 4 p.—Baldwin-Lima-Hamilton Corp., Hamilton, Ohio. (213U)

Transfer Switch Facts

Presents selection pointers for a line of automatic transfer switches —electromagnetic devices for shifting electrical loads from normal to emergency sources. Publication 596, 16 p.—Automatic Switch Co., Orange, N. J. (213V)

Plug-In Busway

Gives technical data and full description of all components for an electrical busway system. Equipment permits direct plug-in to bus bars, and is designed for various pole and voltage applications. Bulletin GEA-6470, 20 p.—General Electric Co., Plainville, Conn. (213W)

Special Tanks

Concerns services of a custom fabricator who specializes in construction of tanks and pressure vessels. Pictures show tools used and some of the completed jobs. 50 p.—Nooter Corp., St. Louis. (213X)

Stainless Sheet Steel

Describes properties, fabrication, and applications for a nickel-free stainless steel. Chart lists analysis and mechanical properties. 14 p.—Washington Steel Corp., Washington, Pa. (213Y)

Refrigeration Systems

Full-color technical bulletin describes advantages of a staged cycle and closed reversing cycle air conditioning systems. Flow charts show equipment layout and operation. 12 p.—A. I. McFarlan Co., Inc., New York City. (213Z)

Packaged Pumps

Details manufacturer's unique pre-packaging plan for 22 sizes of end-suction centrifugal pumps. The cartoning method is said to ease stocking, selection, and installation of the units. Bulletin B-2319, 6 p.—Food Machinery & Chemical Corp., Los Angeles. (213AA)

Constant-Flow Pump

Leaflet shows construction of a radically new centrifugal pump that is said to maintain a constant discharge flow regardless of head. Both sanitary and industrial models are made. 4 p.—Girton Mfg. Co., Millville, Pa. (213AB)

Pipe Stress Values

Fold-out chart gives figures on maximum allowable stresses for seamless and welded carbon, alloy, and stainless steel tubing and pipe. Technical Data Card 154A, 6 p.—Babcock & Wilcox Co., Beaver Falls, Pa. (213AC)

Electrical Equipment

Comprehensive catalog presents a wide line of low-voltage, electrical distribution components such as panelboards, busways, motor control centers, switchboards, switches, circuit breakers, and unit substations. Catalog GEC-1032A—General Electric Co., Plainville, Conn. (213AD)

Reversing Motors

Cut-away drawing illustrates features of a line of rapid reversing motors. Units are available in drip-proof, totally-enclosed, and blower-cooled models. Engineering and selection information provided. Bulletin 1800, 4 p.—Louis Allis Co., Milwaukee. (213AE)

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Vacuum Pump

Leaflet considers features of a motor-driven, oil-wetted vacuum pump, designed to reduce air pressure in operation of an electronic pressure transducer tester. Compact unit has capacity of 1200 cu. in. per min., and top vacuum of 0.2 in. mercury. Data Sheet 2-71, 2 p.—Lear, Inc., Elyria, Ohio. (214A)

Remote Water Coolers

Gives specifications on remote chilling units for employee water cooling systems. Selection data tabled, accessories pictured. 6 p. —Temprite Products Corp., Birmingham, Mich. (214B)

Air Conditioner

Comprehensive bulletin explains advantages of a centrifugal refrigeration unit for chilling water. Packaged chilling system is used in air conditioning applications. Bulletin DS-399, 52 p.—Trane Co., La Crosse, Wis. (214C)

Rerated Motors

Data sheet tables facts on a series of motors in 1-30-hp. range, frame sizes 182 through 326. Motor dimensions are rerated to conform to new NEMA standards. 1 p.—ACEC Electric Corp., New York City. (214D)

Centrifugal Pumps

Covers construction features of a series of single-stage centrifugal pumps in 3- to 6-in. sizes, capacities from 250-2400 gpm. Pumps have double mechanical shaft seals and sealed ball bearings. Bulletin 7248-A, 8 p.—Ingersoll-Rand Co., New York City (214E)

High-Velocity Fans

Depicts a line of blowers specifically designed for high velocity air conditioning and industrial process applications. Comprehensive charts list performance data. Bulletin DS-348-C, 28 p.—Trane Co., La Crosse, Wis. (214F)

MAINTENANCE

Non-Slip Surfaces

Shows features and application of a floor surfacing material containing abrasive grip. Non-slip compound is available in both brown and aluminum colors. 4p. —*Hallemite Mfg. Co., Cleveland.* (214G)

Protective Coatings

Concerns line of corrosion- and abrasion-resistant coatings, adhesives and sealing compounds. Lists product, description, and various applications. 11p.—*Magic Chemical Co., Brockton, Mass. (214H)*

Special Paints

Folder charts a wide variety of special maintenance paints—and where to use them. Both inside and outside applications are noted, and a color chart is included for enamels. Tropical Paint Co., Cleveland, Ohio. (214I)

Absorbent Compound

Lists over 100 uses for a mineral absorbent that speeds maintenance jobs by picking up oils, greases, acids, alkalies, and other unwanted liquids. 4 p.—Speedi-Dri Corp., Menlo Park, N. J. (214J)

Flexible Nipples

Describes easy solution to pipe alignment problems when connecting air and gas lines to industrial gas or oil burners. The answer is a flexible, corrugated steel nipple, available in threaded and flanged connections. Catalog 708B, 4 p.—Hauck Mfg. Co., Brooklyn, N. Y. (214K)

Storage Shelves

Bound catalog shows component parts and some of the resultant storage shelves built from them. Tips on how to plan and order shelving are included. 27 p.—Standard Pressed Steel Co., Hallowell Div., Jenkintown, Pa. (214L)

Sensitive Leak-Detector

Shows how to use a sensitive leak detecting device on any closed system containing Freon or other halogen gas. Unit will spot a leak through which only 1/100 oz. of Freon will pass in a year. Bulletin GEA-6093, 8 p.—General Electric Co., Schenectady, N. Y. (214M)

Lubricant Line

Chart presents complete list of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, and acetylene black dispersions used in maintenance and lubrication applications. Carriers and diluents are given for each product. 4 p.—Acheson Colloids Co., Port Huron, Mich. (214N)

Pipe Insulation

Shows installation of glass fiber insulation for water and low-pressure steam lines. Two types are available: One covered with kraft paper bonded to an aluminum foil, the other covered with canvas. Bulletin IN1.C7, 4 p.—Owens-Corning Fiberglass Corp., Toledo, Ohio. (214O)

Cold-Process Roofing

Shows way to apply a cold-type roofing material right over old roofs at reported savings of 55%. Single and two-ply materials are discussed as well as special flashings. Form 1090, 4p.—Monroe Co., Inc., Cleveland. (214P)

Cure for V-Belt Troubles

Two cartoon pamphlets point up common causes of V-belt wear and failure. Give trouble-saving tips for longer V-belt life. Mail-

ers V-1400-M38P and V-1400-M40P, 8p.—Worthington Corp., Harrison, N. J. (214Q)

All-Purpose Shelving

Treats of advantages for a quickly-erected storage shelf with adjustable shelves and dividers. Multi-purpose units can be used for storing a wide variety of stock parts. Folder 708, 6p.—Frick Gallagher Mfg. Co., Wellston, Ohio. (215A)

Screw and Bolt Catalog

Comprehensive manual lists wide range of socket-head cap screws, square-head setscrews, shoulder screws, stripper bolts, pressure plugs, dowel pins, and other similar fasteners in regular and stainless steels. Photos illustrate products, tables give all selection data. 30p.—Standard Pressed Steel Co., Jenkintown, Pa. (215B)

Uses for Carbon Graphite

Shows a wide range of uses for a carbon graphite material. Tables list properties of the material, photos illustrate bearing, lining, and packing ring applications. Bulletin 55, 12p.—Pure Carbon Co. Inc., St. Mary's Pa. (215C)

Hot-Spray Painting

Describes principles and procedures of a hot-spray painting system, using water as the heating element. Advantages are listed, equipment diagrammed. Form F-286 and IE-114-B, 12p.—DeVilbiss Co., Toledo, Ohio. (215D)

Construction Kit Uses

Depicts a wide range of applications for an "Erector set"-type of building kit. Uses of the perforated steel angle range from machinery tables and conveyors to service platforms and storage racks. 12p.—Acme Steel Co., Chicago. (215E)

Protective Covering

Tells of unique new Teflon product, available in sheet and tape form, that is cementable on one or both sides. Suggested uses range from covering machine surfaces and rails to counter tops, splash guards and other surfaces subjected to corrosive materials. 2p.—Garlock Packing Co., Palmyra, N. Y. (215F)

Paint Pump

Describes operation of an air-driven pump for spray painting. Unit submerges in 55 gal. paint drum and delivers over 1 qt. of fluid per min. Useful for multi-spray-gun operations, and painting of large areas. Diagrams illustrate hookup. 8p.—DeVilbiss Co., Toledo, Ohio. (215G)

MATERIAL HANDLING

Crane, Monorail Parts

Pictures wide line of conductors, terminal fittings, and current collectors for crane and monorail systems. Charts give conductor ratings for convenient selection. Bulletin E-156, 12p.—Industrial Crane & Hoist Corp., Chicago. (215H)

Conveyor Idlers

Describes and specifies a series of idlers and troughing, impact, and return brackets for use with belt conveyors. Details a special idler comprising rubber disks molded on a flexible wire rope. Unit is said to center load and guide belt with great efficiency. Booklet 2-24B, 12p.—Joy Mfg. Co., Pittsburgh (215I)

Bulk-Grain Scale

Treats of an automatic bulk shipping scale for accurate and rapid weighing of all free-flowing grains. Operation is by the pivoted beam principal. Bulletin 4049A, 4p.—Richardson Scale Co., Clifton, N. J. (215J)

Ingredient Handling

Case history shows application of lift trucks to cut bakery ingredient-handling costs. Units are coupled with bulk-flour bins to do the trick. Job study 160, 4p.—Towmotor Corp., Cleveland. (215K)

Power Conveyors

Shows wide line of power-driven belt, roller, and elevating conveyors in both fixed and portable models. Various corner-turning accessories are also depicted. Bulletin 302, 24p.—Harry J. Ferguson Co., Jenkintown, Pa. (215L)

Rubber Belting

Presents four styles of rubber belting: light and heavy duck, smooth sanitary, and a rough-textured finish for heavy-duty and inclined conveying. Also depicted is method for producing endless vulcanized rubber belts. Belt lacing and cutting equipment shown. Bulletin 561, 4p.—General Rubber Corp., Tenafly, N. J. (215M)

Electric Tractors

Presents powerful, compact, electric towing tractors for warehouse service. Button control provides 2 forward and 2 reverse speeds. Riding and walking models are optional. Bulletin KT-156, 4p.—Lift Trucks, Inc., Cincinnati. (215N)

Conveying Chains

Illustrates materials handling system utilizing flexible chains. Units flex in horizontal and vertical directions and operate around 36-in. curves. Bulletin 55-58, 4p.—Chain Belt Co., Milwaukee. (215O)

Plastic Liquid Package

Pocket folder shows equipment procedure for sealing liquids in polyethylene containers. Unit combines conveyor and continuous-band heat sealer. 2p.—Doughboy

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Industries Inc., New Richmond, Wis. (215P)

Conveyor-Belt Line

Lists wide line of light- and heavy-duty duck conveyor belts. And charts present various types of belt-fastening devices. Numerous illustrations show wide industry applications. 20p.—Ton-Tex Corp., Grand Rapids, Mich. (216A)

Flow and Level Detectors

Describes and diagrams three automatic sensing devices that measure material level in chutes, conveyors, bins, hoppers and silos. Two of the units serve as flow alarm indicators, and can be wired to buzzers, horns, flashing lights or other suitable alarms. Technical reference 55D, 2p.—Richardson Scale Co., Clifton, N. J. (216B)

LPG Carburetion

Specifies cost of liquid petroleum gas (LPG) carburetion equipment for industrial trucks. And presents resulting cost savings in equipment operation. Diagrams show carburetion system, additional information covers bulk LPG storage containers. 4p.—Industrial Gas Truck Engineering, Chicago. (216C)

Walkie Lift Truck

Details features of a new walking-type lift truck, powered by four conventional automotive-type batteries. Connected in series, these units give 24 volt operation for high-speed travel. Safety feature comprises button, located at end of handle, which reverses truck if it touches operator's body. Bulletin 910, 4p. — Raymond Corp., Greene, N. Y. (216D)

PROCESSING

Homogenizers

Details over-all construction and component parts of a series of efficient homogenizers. Photos depict parts, drawings illustrate action. Charts give capacities and other pertinent data. Bulletin G-517, 12 p. — Cherry-Burrell Corp., Chicago. (216E)

Liquid-Dry Blender

Presents a unique mixing device for blending liquids and drys. Unit consists of a hollow cylindrical bar rotating in a shell. Liquid is mixed by a distributing disk. Pictures show action. Bulletin 1506, 2 p.—Patterson-Kelley Co., Inc., East Stroudsburg, Pa. (216F)

Process Unit Fabrication

Tells of custom fabricating service for processing equipment, and pictures some special jobs used in the food industry. 4 p.—F. H. Langsenkamp Co., Indianapolis. (216G)

Spiral Blenders

Concerns design and construction of a series of spiral blenders. Units are said to be completely sanitary, and have removable shafts and solid ends. Full specifications given. 8 p.—American Welded Tank & Machy. Corp., Mineola, L. I., N. Y. (216H)

Product Grinding

Considers features of a triple-reduction grinder. Large drawing details construction. Feeder accessories also shown. 16 p.—Prater Pulverizer Co., Chicago. (216I)

INSTRUMENTS

Humidity Recorders

Depicts a portable, two-pen recorder that keeps track of both relative humidity and temperature conditions. Spring-wound and electric drive models are available for 8- and 12-in. charts. Bulletin H 1008, 6p.—*Bristol Co., Waterbury, Conn. (216J)*

Automatic Components

Treats of various transformers, automatic systems, time controls, motorized valves, counters, and electronic components for use in automatic control systems. All devices are pictured and described. Catalog D-31, 20p.—*Automatic Temperature Control Co., Inc., Philadelphia. (216K)*

Electronic Recorder

Photos show appearance of a new electronic, potentiometer recorder-controller designed for maximum accuracy and simplicity of operation. Available in models measuring temperatures, speed, strain, pH, and other quantities that can be resolved into electrical signals. 4p.—Barber-Colman Co., *Rockford, Ill. (216L)*

Mercury Switches

Presents a wide line of sealed, mercury-switch controls for pressure, temperature, liquid level, and timing operations. Units are applicable for heating, refrigeration, air conditioning, and other industrial operations. Catalog 856, 54p. — *Mercoid Corp., Chicago. (216M)*

Flowmeter

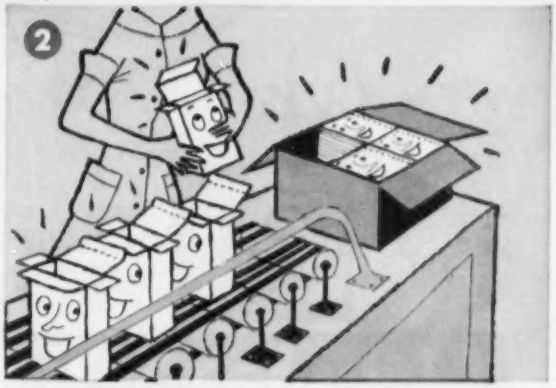
Folder has cutaway view of a combination electric flowmeter, indicator, and integrating recorder. Features and operation are both illustrated. — *Minneapolis-Honeywell Regulator Co., Philadelphia. (216N)*

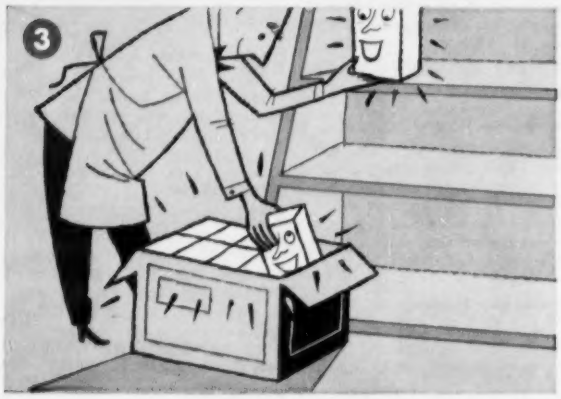
Thermocouple Glands

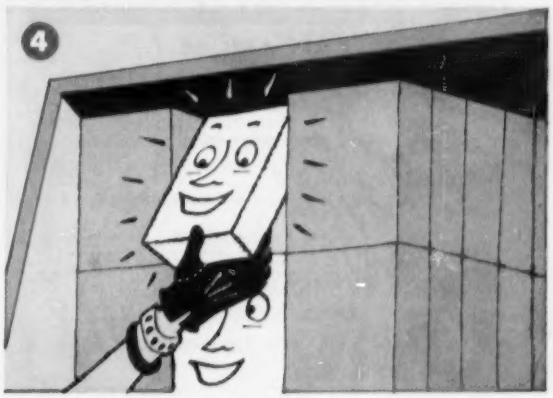
Illustrated booklet depicts wide line of glands, sealants, insulators, and thermocouples for heat-measuring applications. Numerous tables chart selection specifications. Catalog 1556, 28p.—Conax Corp., Buffalo. (216O)

Automatic Identifier

Gives story of an automatic device that prints identifying marks







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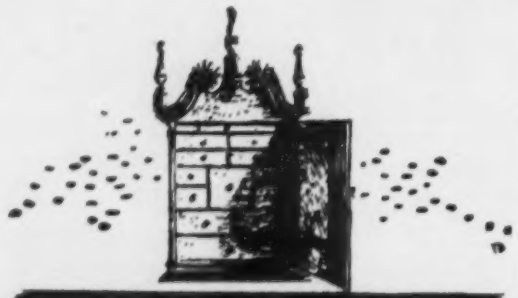

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on strip charts from a remote point. Instrument shows time or sequence conditions that occur during process temperature control work. 4p.—*Royson Engineering Co., Hatboro, Pa. (215P)*

Amplifier Applications

Concerns data and schematic drawings of four typical applications for a direct-current amplifying instrument. Literature covers design features and theory of operation. Data Sheet 80-1, 4p.—*Robertshaw-Fulton Controls Co., Philadelphia. (218A)*

Electronic Instruments

Full information on design features and operation of a series of indicating and recording controllers. These electronic devices are used to measure a wide variety of variables, such as temperatures, flow, pressures, and current. Bulletin P 1245-A, 64p.—*Bristol Co., Waterbury, Conn. (218B)*

PACKAGING

Fluid-Milk Packaging

Details a new way for packaging fluid milk products in a polyethylene-lined, corrugated and insulated box. Pictures show each step of method and handling techniques. 8p.—*Chase Bag Co., Chicago. (218C)*

Valve-Bag Packer

Contains facts on design and operation of a screw-type packager for valve bags. Unit preweighs product with high accuracy and is adjustable for a range of bag sizes. 6 p.—Fulton Bag and Cotton Mills, New York City. (218D)

Automatic Packagers

Folder illustrates automatic wrapping machine, top and end labelers, and a U-board feeder attachment for the automatic wrapper. Food products packaged and labeled on these machines are illustrated. 6p.—*Hayssen Mfg. Co., Sheboygan, Wis. (218E)*

Flavor Catalog

Pocket folder lists—and prices—wide line of flavors, essential oils, aromatics, and specialties. 22 p.—Syntomatic Corp., New York City. (218F)

Bottle Labeler

Considers a 4-model line of foreign-made bottle labeling machines with capacities from 3,000 to 20,000 bottles per hr. Units adapt to many different containers, and body and neck labels. 4p.—Johann Weiss Machinenfabrik und Apparatebau GMBH, Berlin, Germany. (218G)

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for your convenience

USE READER SERVICE

WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

CARROT OIL

makes food

golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

the advertisements on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT
"Think SEARCHLIGHT first"

J. PAUL BISHOP & ASSOCIATES
Registered Professional Engineers
Established 1945
Specializing in:
Food and Chemical Processes
Consultation—Surveys—Design
Engineering—Estimates—Supervision
of Construction, Installation and Start-Up
In ernationally Known
P. O. Box 348 Champaign, Illinois

FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*
Ingredient evaluations • New Products development. Specializing in flour shortenings, milk and other basic ingredients • Facilities; chemical and physical laboratory, bakery, spray dryer and other unit process equipment.
2865 W. Franklin St. Baltimore 23, Md.
440 W. 24th St. New York, N. Y.

LEWIN ASSOCIATES
Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultation — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing — Consultation in Managing Warehousing, Distribution — Formulae, New Products
243 West 56 St., N. Y. 19, N. Y. JUdson 6-1749

GUSTAVE T. REICH & ASSOCIATES
Consultant to the Food Industries.
COMPLETE CONTINUOUS PROCESSES.
Operation — Waste Disposal
AUTOMATION
1422 Chestnut St. Philadelphia 2, Pa.

SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

CONSULT THESE SPECIALISTS
Let them save your time by bringing their broad experience in their specialty to bear on your problems.

FOSTER D. SNELL
Research Laboratories
SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.
Write For
"Food Facts"
29 W. 15th St., N. Y. 11 WAtkins 4-8800

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods
Food and Drug Libels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street Waltham 54, Mass.

WISCONSIN ALUMNI RESEARCH FOUNDATION
Projects, Consultation, and Production Control Services
in
Biochemistry, Chemistry, Bacteriology, Toxicology—Insecticide Testing and Screening.
Write for price schedule.
P. O. Box 2217-P. Madison 1, Wisconsin

THE CONSULTING ENGINEER

"By reason of special training, wide experience and tested ability, coupled with professional integrity, the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert. His services, which do not replace but supplement and broaden those of regularly employed personnel, are justified on the ground that he saves his client more than he costs him."

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

RATES

DISPLAYED

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted—The rate is one-half of the above, payable in advance.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS or Inquiries to Classified Advertising Division of FOOD ENGINEERING, P. O. Box 12, N. Y. 36, N. Y.

ADVERTISING MAN WANTED FOR TECHNICAL PRODUCTS

- Previous advertising experience not necessary but helpful. Must have at least two or three years of college with courses in engineering and technical subjects and like to write.
- If you have the qualification we have an opportunity open for you.
- Man selected will be trained in all phases of industrial advertising.
- In your letter of application state age, education, positions held, and give statement of why you want a career in advertising.
- Location: well-known Connecticut company.

P-1206, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOOD TECHNOLOGIST

Excellent permanent staff position for qualified person. Assignments will include customer packaging problems and development of our own products. Position is with a progressive corporation which has well equipped Engineering and Research Laboratories located in Central Ohio. Send details of background and experience to:

P-2028, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

RESEARCH MILLING ENGINEER

Opportunity for top flight Research Engineer for modern Corn Mill in Midwest. Experience in Corn Milling preferred. Scope of work to include improvement of Milling techniques as well as new product development. Excellent opportunity for aggressive individual. Give full particulars in letter to

P-1714, Food Engineering
520 N. Michigan Ave., Chicago, Ill.

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you c/o This publication, Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Wanted: Mechanical or Electrical Engineer. B. S. Degree, 25-30. Three to five years experience in chemical or food process engineering. For general engineering work, including process studies, heat and material balances, structural design, equipment design, field engineering, and drawing board. Salary commensurate with experience and ability. Please send brief resume of personal history, education, professional experience, including present position, and salary desired to: Edgar B. Cole, The Amalgamated Sugar Company P. O. Box 431, Ogden, Utah. Replies will be held in strictest confidence.

Wanted: Sales Application Engineer and Salesmen with frozen food packaging experience, for large packaging machinery manufacturer. Sales experience not necessary. Mechanical or Industrial Engineering education and experience useful but not necessary. Excellent opportunities for growth and income in expanding field. Principal travel area—Midwest. Contact Food Machinery and Chemical Corporation, Hoopeston, Illinois, ATT: R. F. Hartman, Personnel.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F. P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Technical representative for medium sized firm. Production supervision experience with fruit, tomato products, maraschino cherries. BS Food Technology, age 29, West Coast. PW-2183, Food Engineering.

Food Technologist—Chemical Engineer extensive varied experience canning, quality control, sauce formulations, kraut fermentation and specialty products. Knowledge of dairy, cheese and ice cream products. Capable of initiating efficient quality control and cost systems. PW-2236, Food Engineering.

Food Technologist Graduate Diversified experience production, sales, research development, plant modernization, management-milling, baking, mixes, packaging. Desire branch or departmental large or charge small concern. PW-2201, Food Engineering.

Manufacturer's Representative, Chemist, well established,

seeks additional representation of reputable Food raw material or supply firm. Chicago and Middlewest.

RA-1336, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

New "SEARCHLIGHT" Advertisements

received by July 25th will appear in the August issue subject to space limitations.

Classified Advertising Division
FOOD ENGINEERING
P. O. Box 12 New York 36, N. Y.

FOR RATES OR INFORMATION

About Classified Advertising

Contact The McGraw-Hill Office Nearest you

ATLANTA, 3
1321 Rhodes-Haverty Bldg.
WAlnut 5778

BOSTON, 16
350 Park Square
HUbbard 2-7160
H. J. SWEGER

CHICAGO, 11
520 N. Michigan Ave.
MOhawk 4-5800
W. HIGGENS

CINCINNATI, 37
1915 Rockingham Ave.
REdwood 1-4537
W. GARDNER

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000
W. SULLIVAN

DALLAS, 2
Adolphus Tower
Main & Akard Sts.
D. BILLIAN

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793

LOS ANGELES, 17
1125 W. 6 St.
MAdison 6-9351
P. CARBERRY

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000
R. LAWLESS
S. HENRY
D. COSTER
R. HATHAWAY

PHILADELPHIA, 3
17th & Sansom St.
Rittenhouse 6-0670
H. BOZARTH
E. MINGLE

PITTSBURGH, 22
919 Oliver Bldg.
Atlantic 1-4707
W. SULLIVAN

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
W. HIGGINS

SAN FRANCISCO, 4
68 Post St.
DOuglas 2-4600
W. WOOLSTON

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED —RATES— DISPLAYED

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADS or Inquiries to Classified Advertising Division of Food Engineering, P. O. Box 12, N. Y. 36, N. Y.

BUSINESS OPPORTUNITY

Wanted: well rated food company desiring diversification of food products manufacturing by consulting food chemist 20 years experience with a successful food products manufacturing expansion plan of research and production. BO-1750, Food Engineering.

CONTRACT WORK WANTED

Condensing Time available on all stainless steel triple effect Mojonnier equipment. Large capacity. Good laboratory controls. For further information write to CWW-2179, Food Engineering.

WANTED

Anything within reason that is wanted in the field of Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

NEW NON-FAT TOPPING WHIP

As a research chemist, in response to world wide need and demand for diets with less fat, I have developed a new high protein non-fat topping that whips, looks, tastes, acts like whipped cream at greatly reduced cost. Produces a whip of larger volume and longer lasting. Suitable for use on pies, cakes, ice cream, custards, etc. Not perishable, with longer shelf life it can be packaged as a dry mix, sold through groceries. More economical. Whip as needed. Patentable. Can be pre-whipped in pressure containers. Exclusive rights available on an outright or royalty basis if equipped and qualified to market nationally. Principals only. Write inventor.

BO-2237, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE:

2 Karl Kiefer Rotary Air Cleaners, Model #1—12 stem for 8 oz. bottles and 3¼ inch jars. Little used.

1 Vulcan #5000 single deck gas fired oven with safety pilot, 58000 B.T.U. Natural gas. Excellent condition.

1 #1218 Eclipse 18" atmospheric wheel gas burner, capacity 210 c.f.h., natural gas with safety pilot. Excellent condition.

1—#40—1"—KV. Partlow temperature controller, range 100—650°F. Excellent condition.

FS-2133, Food Engineering
Class Adv. Div. PO Box 12, N. Y. 36, N. Y.

MONORAIL TRACK

for sale—3000 feet of 3000 pound capacity Coburn track with trolleys and hangers offered at fraction of new price.

Contact:
CONCORD REAL ESTATE COMPANY
Yorklyn, Delaware

WANTED TO BUY

One small unscrambling table and one automatic #28 screw capper.

DELAWARE PUNCH SYRUP CO.
8047 HARRISBURG HOUSTON 12, TEXAS

WANTED
USED AMERIO PLATE FREEZER

In good condition. State price, Specifications, and location. Write

W-2005, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

• • • • IN STOCK AT LOEB'S • • • •

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic
40" st. steel Centrifugals: Fletcher 12" copper, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51.
Conveyor, port. Rapid Standard, 16' lg.
Cutter, Bone: Wausau, 5hp.
Cutters, silent, Buffalo 32" and 43".
Demineralizer: Barnstead 80 GPH.
Disintegrator: Rietz RD-18 st. steel, 75 hp.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Devine 20 shelf.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filler Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1'.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettles, Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World. Ermold—auto and semi-auto.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Colloid: Charlotte st. steel 1 hp., iran 25 hp.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Reactors: 200 gal. st. steel and 18 x 60" st. Steel.
Screens: Rotex 20 x 48", 42 x 84", 18 x 50". Selectro 4 x 10' Abbe Blutergess #1.
Sealers, carton: Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, water: Barnstead 75 gal.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. Chicago 22, Ill.
Telephone: Seeley 7-1431 Our 31st Year

FOR SALE

5—TANKS S/S SANITARY 500 GAL. TO 2,800 GAL.
1—TRUCK TANK S/S SANITARY 2,500 GAL., 3 COMPARTMENT.
3—DOUBLE DRUM DRYERS, 24" x 36", 32" x 90", 32" x 120".
1—150 SQ. FT. S/S SANITARY EXCHANGER.
2—EVAPORATORS, S/S SANITARY, DOUBLE EFFECTS, 588 AND 839 SQ. FT.
3—VACUUM PANS, S/S SANITARY 36", 48", 72" COIL TYPE.
1—STRUTHERS-WELLS S/S SANITARY MIXING CUBE TUMBLER WITH 270 CUBIC FT. TOTAL CAPACITY. EXCELLENT OFFERING.

BEST EQUIPMENT COMPANY
617 Davis Street Evanston, Illinois
DAvis 8-0926

FOR SALE

Moving to our new location. Fillers, cappers, labelers, agitators, stainless steel tanks, stainless steelware, sanitary fittings, case sealers, conveyors, etc.

ACE
637 E. 71st St. Chicago 19, Ill.

NEW, NEVER USED
STAINLESS STEEL CIRCULAR KNIVES

8" in diameter, 1-⅜" bore. Approximately 18 to be sold.

Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.
FS-2187, Food Engineering

USED PICKLE BARRELS

Recoopered, six-hoop, 47-48 gallon capacity, hardwood casks. Formerly contained pickles and/or relish. Will require recoopering. Approximately twenty-five hundred located at Holland, Michigan; forty-nine hundred at Muscatine, Iowa. Offered for cash as is, all or part. Buyer to load or pay for loading if done by owner. Write or phone either:

Mr. Philip Frank — H. J. HEINZ CO. — Holland, Michigan
Mr. R. J. Morrissey — H. J. HEINZ CO. — Muscatine, Iowa

FOR SALE

30" Copper Coating Pans with steam coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. H-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

FMC

EQUIPMENT FOR FOOD INDUSTRIES

Complete Plants For Sale

Brewery — Distillery — Winery — Macaroni — Spaghetti — Ravioli — Vegetable Processing — Canning — Dog-Cat Food; Meat Packing; Vegetable Oil Extraction; Pectin Extraction, etc.

COLLOID MILLS; Homogenizers, Viscolizers; send for complete list.

DRYERS; send for complete list.

FILLERS; For Liquids, Semi Liquids, Pastes, Powders, Crystals, etc. Karl Kiefer, Stokes & Smith, Triangle, Food Machinery Co., Filler Machinery Co. and other standard makes for all filling purposes; Semi and Fully Aut.

FILTERS; All types including Filter Presses, Disc Filters, Pressure Filters, send for complete list.

LABELERS; Semi and Fully Automatic Units by World, Ermold, New Jersey, Pneumatic Scale, and others; Please submit labelling problem for exact recommendations.

MIXERS; NEW Falcon Ribbon Mixers in Steel or Stainless Steel, all sizes; Portable Agitators, Mixing Tanks; Heavy Duty Dough and Mass Mixers, Double Arm, Jacketed or Unjacketed. Send for complete List of Availables.

KETTLES, TANKS, VACUUM PANS, REACTORS; In Stainless, Steel, Copper, Nickel, Monel and Iron; send for complete list of our large stock.

EVAPORATORS, STILLS, COLUMNS by Buffalo, Swenson, Blaw Knox, Zaremba and others in all wanted metals.

CUTTERS—DICERS—PEELERS

4287 A34—Buffalo Rotary Cutter 20" Bowl 3 HP
4031 R6—Albright Nell Rotary Cutter; 11 Blades; 22" Dia.
4282 H2—Abbe Rotary Cutters No. "0" and "00"
3625 D2—Munson Rotary Cutter; Size "9"; 3½" x 11" Feed
4031 R5—Jones Superior Band Saw; 19½" Blade; 2 HP
3936 E1—Anderson Dicer Model No. 4 with 1 HP motor
3871 G2—Sterling Model Em1D with 1 HP motor
3484 A50—Sterling Carborundum Type Veg. Peeler; Model 32-50
3628 D1—Cinci Butchers Meat Grinder; 4½" Screw; 10 HP
3245 S1—Automatic Sheeter for Plastic Sheets up to 30"

SEND US YOUR INQUIRY

FRED R. FIRSTENBERG, *Pres.*

FIRST MACHINERY CORP.
209-289 TENTH ST.
BROOKLYN 15, N. Y.
Sterling 8-4672

A BRILL BUY
. . . IS THE BEST BUY

SPECIALS

2—Baker Perkins 100 and 50 gal., 316 S.S. Sigma Blade, jacketed Mixers.
1—L. R. 208 ton Jet Refrigeration Unit.
1—Buflovak 32"x120" double drum Dryer.
1—Buflovak 6' x 5'6" Monel, single drum Flaker.
1—Link Belt 5'2" x 20' steel Roto-Louvre Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer 304 S.S.
3—Elmco 18"x24", 18"x12", 316 S.S. Rotary Vacuum Filters.
2—Bird 24"x38", 18"x28", 304 S.S. solid bowl, Continuous Centrifuges.
1—Sharples PN-14 Super-D-Canter 304 S.S.
1—Fletcher 20" Suspended type Centrifugal 304 S.S.
4—Sweetland Filters #3, #5, #7, #12.
6—Day "Cincinnatus" Sigma Blade Mixers 600, 200 and 100 gal.
1—#2TH Mikro Pulverizer, 7½ HP motor.
2—Rotex Sifters 40"x120", 40"x84".

BRILL EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

HERE'S THE BEST!

3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
1—Stainless Steel Hersey Rotary Dryer, 5'x26'.
3—Buflovac 42x120, 32x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—54"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.
1—Unused #12 Sweetland FILTER, 48 bronze monel covered bottom drainage leaves 3" o/c, latest type; 1—#2, 23 copper leaves 1¼" o.c.
1—Day #30 Imperial jack. Mixer, 75 gal.
9—Sperry 18x18" Filter Presses, 11 ch.
5—Horix. Dry Powder Ribbon Mixers, 4000#, 1500#, 500#.

OUR 39TH YEAR

Consolidated Products Company, Inc.
158 Observer Hgway, Hoboken, New Jersey
Tel.: HO 3-4435 • N. Y. Tel.: BA 7-0600

JULY SPECIALS

2 Pony Labelers 86MXX and 86ML
Biner Ellison Model 16-Q Filamatic
World Twin Turret Labeler, 120 PM
2 Rotex Sifters 40x84" & 60x120"
MRM 12 spt. SS Rotary Vacuum Filler
Premier 6" SS Colloid Mill 20 HP motor
New SS Sturtevant #7 Rotary Blender
Wrap Around Labelers, All Makes & Sizes
Capem S1F Auto. Capper, up to 88mm
1 & 2 S/S Elgin Piston Fillers
Resina Capper, twin, 120 per minute
Mikro #4 Pulverizer with 40 hp Motor

NEW—STEEL & S/S MIXERS, KETTLES TANKS & DRYERS. Fabricated To Your Specifications. Engineering Advice Available.

WE BUY COMPLETE PLANTS OR SINGLE UNITS
WHAT HAVE YOU FOR SALE?
YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street, Brooklyn 32, N. Y.
SOUTH 8-4451—4452—8782

FOR SALE

100 to 300 gal. S.S. Mix Tanks, water jkt.
250 gal. Vert. S.S. Tank, insul., agit.
330 gal. S.S. Tank, 45"x48", side agit.
500 gal. Pfaudler G.L. Tank, jkt., T.C. Ceil.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
1000 to 3000 gal. Glass Lined Tanks, agit.
3—#10BB Waukesha Pumps, 1 H.P.
#25BB Waukesha Pumps, 1 H.P.
1½" S.S. Centrif. Pump, 2 H.P.
50 gal. S.S. Premixer (Tank), side agit.
20" Vercione Centrifugals, copper baskets.
Hobart Grinder, 1½ H.P.
15 H.P. Clayton Steam Generator.
Little Giant Ice Breaker, 1 H.P.
Girdler S.S. Votator, 2 tubes.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4615

Prompt ANSWERS to business problems . . .

MISCELLANEOUS business problems are daily being solved quickly and easily by the use of the Classified Advertising Sections of this and other McGraw-Hill publications.

When you want additional employees, want to buy or sell used or surplus new equipment, want additional products to manufacture, seek additional capital, or have other business wants — advertise them in the Classified Advertising Section for quick, profitable results.

American Machinist
Aviation Week
Business Week
Bus Transportation
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Control Engineering
Electrical Construction & Maintenance
Electrical Merchandising
Electrical Wholesaling
Electrical World
Electronics
Eng. & Mining Journal
E. & M. J. Markets
Engineering News-Record
Factory Mgt. & Maintenance
Fleet Owner
Food Engineering
National Petroleum News
Nucleonics
Petroleum Processing
Power
Product Engineering
Textile World

Classified Advertising Division

McGraw-Hill Publishing Co.

P. O. Box 12, New York City 36, N. Y.

FOR SALE

1—Niagara Model 510-28 type 316 Stainless Steel Filter, 500 sq. ft., with extra set leaves.

3—Fitzpatrick Comminutors, Stainless Steel, models, D, F & K.

1—Buflovak #6.5 Stainless Steel Double Effect Evaporator—588 sq. ft.

1—Conkey Triple Effect Evaporator, Silicon Bronze—1900 sq. ft.—UNUSED.

2—Davenport 2A Grains Presses.

1—Stainless Steel Spray Dryer, 19' dia. x 20' high.

1—Bowen 5 dia. Stainless Steel Spray Dryer.

1—Buflovak Double Drum Dryer 32" x 52".

2—Double Drum Dryers, 24" x 36" drum.

1—Rotary Hot Air Dryer 36" x 15' Everdur.

2—Rotary Steam Tube Dryers: Louisville 6' x 30'; Hardinge 4' x 30'.

4—Mikro Pulverizers, #2DH, #2-TH, #3-TH.

1—3000 gallon Vertical St. St. Tank, 7' D x 10' H x 5/16" thick, type 304; dished heads.

25—Stainless Steel Tanks—30 gal. to 6500 gal.

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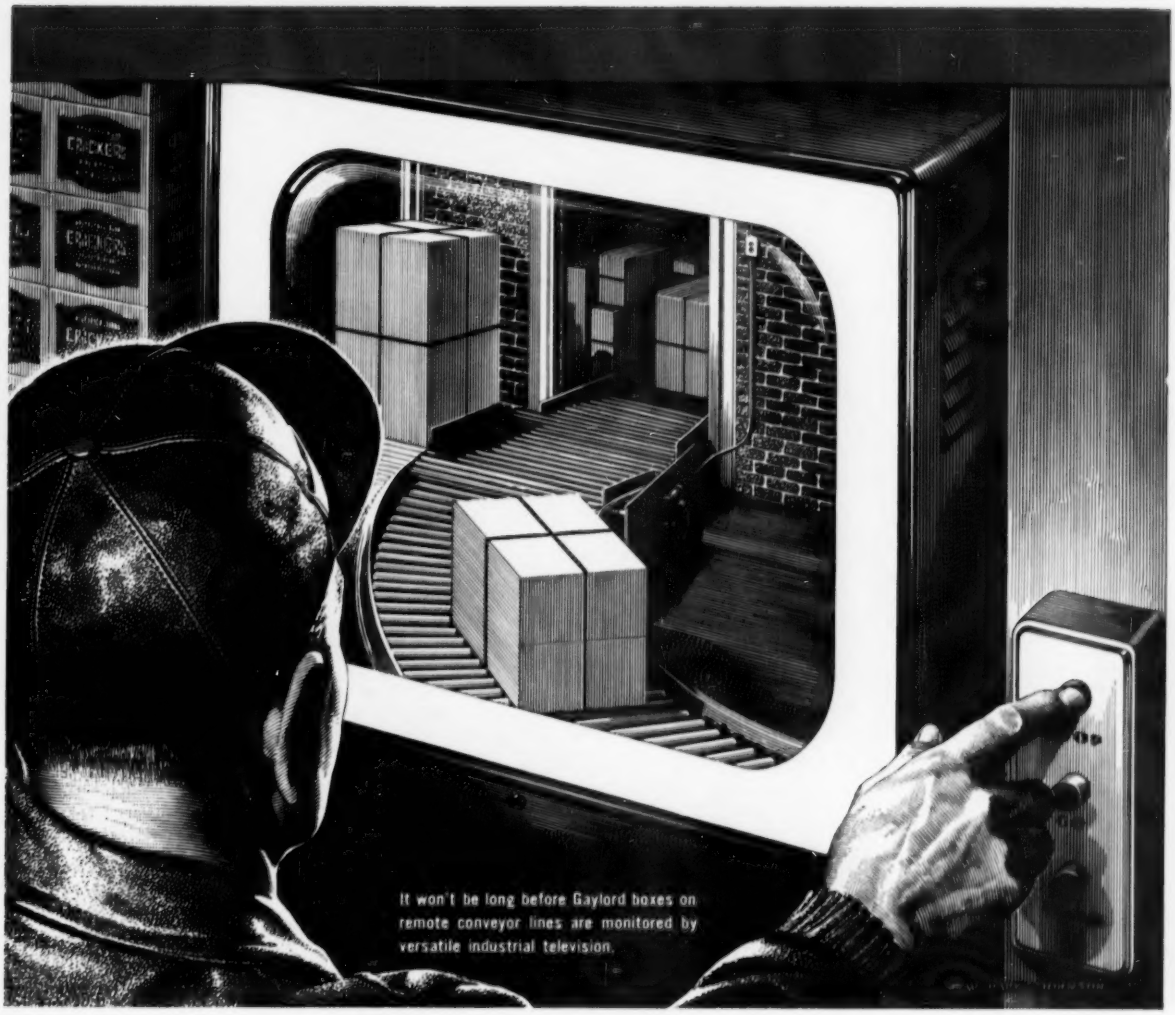

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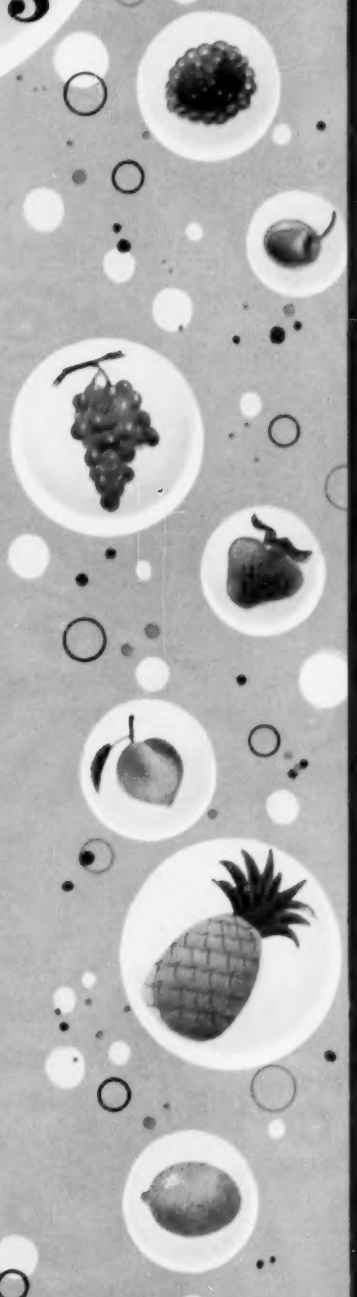

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